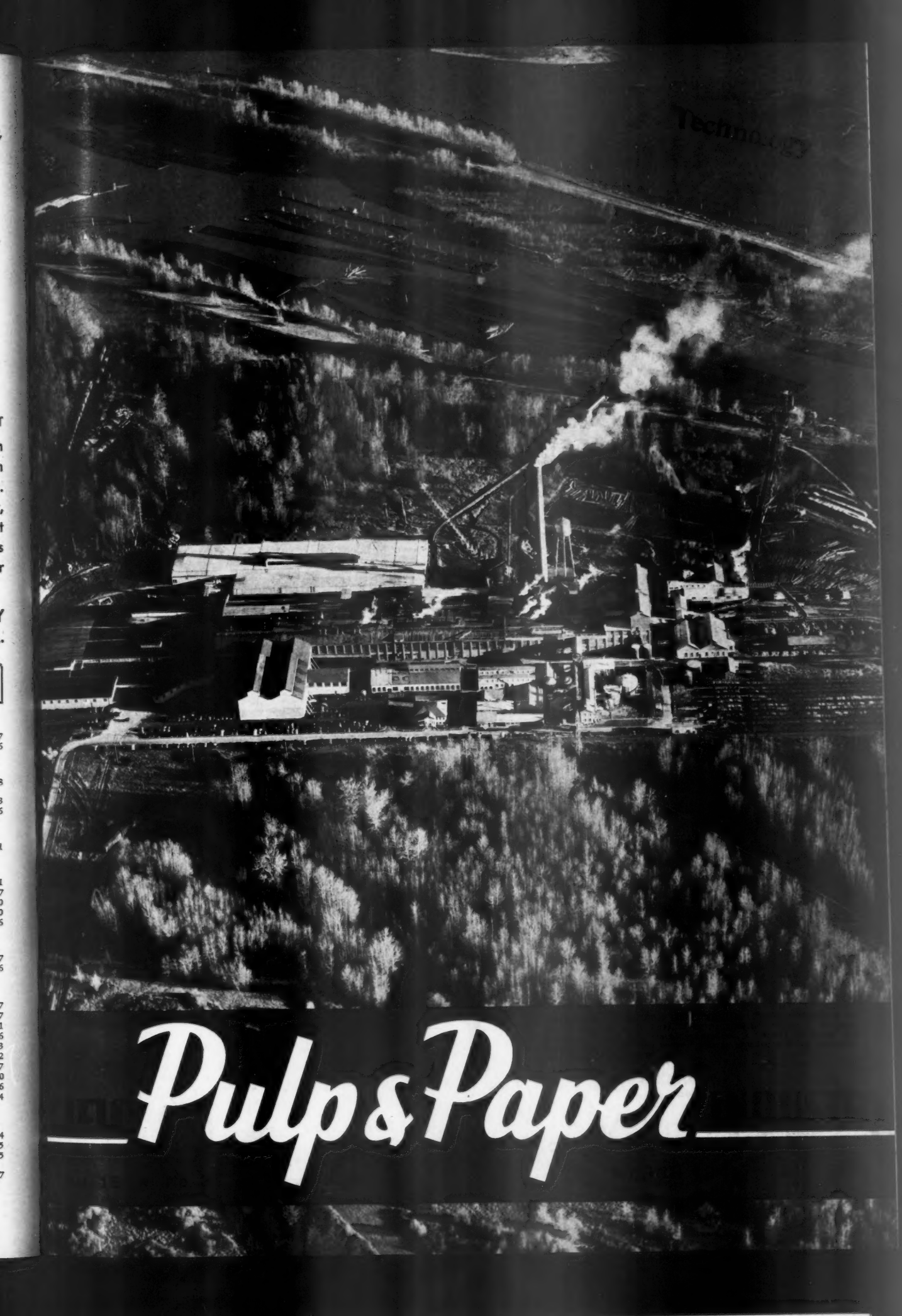
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Pulp Prices Remain Stable Entire Year

IN contrast with many commodities, and in particular with cotton, pulp prices will have remained stable for an entire year when July 1, 1941, rolls around.

Assurance to pulp buyers that prices will remain the same through June was given the latter part of February by domestic and Canadian producers. It was on July 1, 1940, that the present base prices were put into effect.

Bleached sulphite will continue to sell for $72.50 per short ton, ex dock Atlantic ports; unbleached sulphite for $63.50 per short ton, and bleached kraft for $82.50 per short ton. These are the basic prices and are subject to variations according to qualities. Dissolving grades of bleached sulphite likewise will be unchanged for the second quarter of 1941.

There is some variation in unbleached prices, newsprint grade unbleached sulphites selling several dollars below the $63.50 price, and high color unbleached pulps selling at a few dollars premium.

Some believe that prices on spot deliveries will be much higher than contract prices during the second quarter due to the tight supply situation. With the paper industry as a whole running at around 90 per cent of capacity and importations from Europe still unavailable, the demand for pulp in excess of contracts is, this group thinks, very likely to be strong enough to bid up prices for what spot pulp there may be available. The supply situation is tightest in the case of high quality unbleached now that stocks of European pulps are supposed to be exhausted.

It was last July that the pulp producers assured the Advisory Commission to the Council for National Defense that any further price advances would be based upon increased costs. The Defense Council approved this policy and has looked with favor upon the efforts of American pulp producers to supply domestic paper mills with sufficient pulp for their requirements at a fair price.

Association of Pulp Consumers

● At the time of the annual meeting of the American Paper & Pulp Association in New York, February 17-21st, representatives of pulp buying paper mills formed the Association of Pulp Consumers with the stated purpose that only through united action could they assure their mills of a sufficient supply of wood pulp at fair prices.

The Association of Pulp Consumers announced that at the start its membership consisted of more than sixty mills and that it was expected that the list would increase to nearly three hundred.

The following men were elected to the executive committee: J. M. Bergstrom, Bergstrom Paper Co., Neenah, Wisconsin; Douglas Crocker, Crocker, Burbank & Company, Fitchburg, Mass.; C. G. Driscoll, Sorg Paper Co., Middletown, Ohio; George K. Ferguson, Watervliet Paper Co., Watervliet, Michigan; H. H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; D. W. G. Hollister, A. P. W. Paper Company, Albany, N. Y.

Robert Nelson, Glassine Paper Co., West Conshohocken, Pa.; W. Irving Osborne, Cornell Wood Products Co., Cornell, Wisconsin; James F. Ryland, Standard Paper Co., Richmond, Va.; and George R. Wallace, Fitchburg Paper Co., Fitchburg, Mass.

It was reported that statements were made to the meeting that present "high" prices were not due to a shortage as close to half a million tons were exported in 1940. Some of the buying mills consider present pulp prices too high and undoubtedly the purpose of this newly organized group is to try and reduce pulp prices.

Those who are familar with the internal workings of the pulp producing mills, as for example the Defense Advisory Commission economists, do not consider pulp prices as being too high.

The increases in pulp prices which went into effect for the third quarter of 1940 were justified by increased costs and by the fact that the producers were about breaking even at the old prices before costs increased. Some were losing money.

It is generally recognized that the prices of certain grades of paper are too low and should have been raised last summer. In other words, pulp was bought at too low a price for many years. Now that it is upon a basis profitable for producers, pa-

per prices ought to be increased in proportion. It is unreasonable to ask that the pulp producers go back to using red ink.

That the pulp producers desire to stabilize prices at a fair level is obvious for they have done so for a full year. The demand of last summer and fall would normally have run prices much higher on a basis of supply and demand. But pulp producers have cooperated with their customers and with the government in holding prices down.

Pulp prices will stay at a level which will keep the greatest possible number of buying mills competitive with self-contained mills and still return a fair profit to the pulp mills. The pulp producers in both the United States and Canada must naturally keep their customers in business as well as themselves.

It appears at present that any actual shortage will be limited almost entirely to certain high quality unbleached sulphite pulps made only in Europe before the war and now being made to a limited extent on this continent. Apparently there is plenty of unbleached sulphite available if quality is not a factor.

Exports have not injured domestic pulp consumers. The producers have followed a policy of supplying their American contract customers first before exporting, thereby limiting exports which bring higher prices than domestic business.

Domestic Pulp Stocks Increase

● Stocks of all grades of domestic produced pulp were higher at the end of January than at the first of the year with the exception of unbleached sulphite, according to data released by the United States Pulp Producers Association.

On hand at the producing pulp mills at the end of January were stocks for own use and for sale of own manufacture totaling 163,606 short tons. This was 18,528 short tons larger than the total of 145,078 short tons on hand at the end of December, 1940.

Production of pulp in the United States in January totaled 657,659 short tons as compared with 608,235 short tons produced in December, 1940, an increase of 49,334 short tons. These figures are from data compiled by the United States Pulp Producers Association.

January production consisted of 132,413 short tons of bleached sulphite pulp compared with 120,758 in December; 84,020 short tons of unbleached sulphite against 80,018 short tons in December; 335,488 short tons of sulphate pulps in January compared with 308,306 short tons in December; 104,856 short tons of groundwood against 99,153 short tons in December (only 59 per cent reporting). On other grades the figures represent close to 100 per cent of productive capacity reporting.

In January producers of pulp used 510,138 short tons of their own pulp against 475,580 short tons in December. They shipped 111,102 short tons in this country against 108,772 short tons in December; and, exported 18,979 short tons compared with 26,122 short tons in December.

Stocks at the end of January were made up of 47,164 short tons of bleached sulphite; 31,125 short tons of unbleached sulphite; 45,704 short tons of sulphate pulp; and, 39,613 short tons of groundwood. All grades showed increases but unbleached sulphite of which there were stocks at the end of December totaling 32,971 short tons. The decline at the end of January was 1,846 short tons.

TAPPI Holds Large Dinner Meeting in Longview

● The Pacific Section of TAPPI held its fifth dinner meeting of the 1940-1941 season at the Hotel Monticello in Longview, Washington, on the evening of March 4th. One hundred and one men were in attendance.

Carl F. Braun, vice chairman of the Pacific Section and vice president and mill manager of the Hawley Pulp & Paper Company, presided in the absence of Fred A. Olmsted, chairman, who was in the East, having attended the annual meeting in New York in February.

Dr. Walter F. Holzer of the Central Technical Laboratory, Crown Zellerbach Corporation, Camas, Washington, presented a paper on "Botanical Studies of Pulp by Means of Chemical Swelling." Dr. Holzer's talk was accompanied by slides showing the swelling effects on fibers and fibrilles of various chemical treatments. His paper will appear in an early number of PACIFIC PULP & PAPER INDUSTRY.

Following Dr. Holzer's talk, a sound moving picture, "Highlights and Shadows," was presented by the Eastman Kodak Company. The movie covered the entire range of the company's operations, from the manufacture of lenses, shutters, cameras, chemicals to the production of special photographic papers.

Mr. Braun announced that the next dinner meeting will be held in Port Angeles, Washington on Tuesday evening April 8th, at the Port Angeles Country Club.

The appreciation of TAPPI was expressed by Mr. Braun to Edward P. Wood, technical director, Longview Mill, Pulp Division Weyerhaeuser Timber Company, who arranged the Longview dinner.

The following men attended the dinner in Longview on March 4th:

● **O. C. Abbott,** The Bristol Company, Seattle; **C. E. Ackley,** Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Lebanon, Ore.; **F. Rudolph Armbruster,** Great Western Division, The Dow Chemical Co., Seattle; **R. E. Astle,** Pulp Division, Weyerhaeuser Timber Co., Longview; **L. W. Bailey,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Geo. H. Beisse,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Homer H. Best,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Louis H. Blackerby,** Pacific Pulp & Paper Industry, Portland; **Elliott Bowdoin,** Eastman Kodak Company, Portland;

● **Carl E. Braun,** Hawley Pulp & Paper Company, Oregon City; **J. G. Carson,** Longview Fibre Company, Longview; **G. R. Chambers,** Pulp Division, Weyerhaeuser Timber Co., Longview; **R. E. Chase,** R. E. Chase & Co., Tacoma; **R. E. Chase, Jr.,** R. E. Chase & Co., Portland; **Wm. W. Clarke,** Longview Fibre Co., Longview; **Robert B. Colby,** Coos Bay Pulp Corp., Empire; **R. E. Dana,** Longview Fibre Co., Longview; **E. A. Denning,** Pulp Division Weyerhaeuser Timber Co., Longview; **R. E. Drane,** St. Helens Pulp & Paper Co., St. Helens.

● **M. L. Edwards,** Pulp Division, Weyerhaeuser Timber Co., Longview; **A. E. Erickson,** Weyerhaeuser Timber Co., Longview; **Lloyd R. Ewing,** Longview Fibre Company, Longview; **Carl Fahlstrom,** Longview Fibre Company, Longview; **Donald G. Felthous,** Pulp Divi-

sion, Weyerhaeuser Timber Co., Longview; **O. E. Fox,** Pulp Division, Weyerhaeuser Timber Co., Everett; **Harry Fromong,** Hawley Pulp & Paper Company, Oregon City; **G. B. Gallaway,** Crown Willamette Paper Company, Division of Crown Zellerbach Corp., Camas; **Irving R. Gard,** Merrick Scale Mfg. Co., Seattle; **Wm. R. Gibson,** Northwest Filter Company, Seattle; **Robert Goettling,** Hooker Electrochemical Company, Tacoma.

• **J. E. Goodwillie,** Beloit Iron Works, Beloit, Wisc.; **James Gould,** Longview Fibre Co., Longview; **C. H. Graham,** Bumstead-Woolford, Portland; **D. C. Greeley,** Pulp Division, Weyerhaeuser Timber Company, Longview; **L. R. Guthrie,** Pulp Division, Weyerhaeuser Timber Co., Longview; **H. W. Hall,** The Dicalite Company, Seattle; **R. N. Hammond,** Pulp Division, Weyerhaeuser Timber Co., Longview; **John F. Hart,** Longview Fibre Company, Longview; **H. A. Hauff,** Weyerhaeuser Timber Co., Longview; **W. H. Haverman,** Pulp Division, Weyerhaeuser Timber Co., Longview.

• **H. R. Heuer,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Edw. J. Hinde,** Pulp Division, Weyerhaeuser Timber Co., Longview; **W. F. Holzer,** Central Technical Dept., Crown Zellerbach Corp., Camas; **A. H. Hooker, Jr.,** Hooker Electrochemical Co., Tacoma; **George K. Horton,** Longview Fibre Co., Longview; **Otto L. Hudrlik,** The Flox Co., Portland; **J. W. Ingersoll,** Hooker Electrochemical Co., Tacoma; **J. M. Johnston,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Lyal Jones,** Pulp Division, Weyerhaeuser Timber Co., Longview; **John W. Klein,** Longview Fibre Co., Longview; **Carl F. Leitz,** Longview.

• **Clark Lewis,** Pulp Division, Weyerhaeuser Timber Co., Longview; **R. P. Lungreen,** Soundview Pulp Co., Everett; **A. C. McCorry,** St. Regis Paper Co., Tacoma; **C. R. McCully,** Pulp Division, Weyerhaeuser Timber Co., Longview; **G. H. McGregor,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Paul F. Miescke,** Pulp Division, Weyerhaeuser Timber Co., Longview; **T. E. Moffitt,** Hooker Electrochemical Co., Tacoma; **T. H. Moran,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Jack L. Murrow,** Longview Fibre Company, Longview; **Vern Mauerman,** Pulp Division, Weyerhaeuser Timber Company, Longview; **Hobart H. Newman,** Swenson Evaporator Co., Harvey, Ill.; **Robert Noble,** Hooker Electrochemical Co., Tacoma.

• **Max R. Oberdorfer,** St. Helens Pulp & Paper Co., St. Helens; **Adolf Orup,** Soundview Pulp Company, Everett; **W. M. Osborne,** Hooker Electrochemical Company, Tacoma; **G. V. Palmrose,** Pulp Division, Weyerhaeuser Timber Company, Longview; **Frederic M. Pape,** Wilson & Geo. Meyer & Co., Seattle; **William Pittam,** Pulp Division, Weyerhaeuser Timber Company, Longview; **Carl Ramstad,** Soundview Pulp Co., Everett; **E. D. Rich,** Oregon Pulp & Paper Company, Salem; **Ross Roberts,** Vaughan Motor Co., Portland; **J. W. Robinson,** Leeds & Northrup Co., San Francisco.

• **Oliver Ronken,** Soundview Pulp Company, Everett; **A. J. Rosengarth,** Hooker Electrochemical Company, Tacoma; **Rex H. Russell,** Longview Fibre Company, Longview; **J. E. Ryberg,** St. Helens Pulp & Paper Company, St. Helens; **Walter A. Salmonson,** Simonds Worden White Co., Seattle; **Jack V. Savage,** Crown Willamette Paper Co., Division of Crown Zellerbach Corp., Camas, Wn.; **Barton W. Sawyer,** Northwest Filter Co., Portland, Ore.; **William F. Schakohl,** Pulp Division, Weyerhaeuser Timber Co., Longview; **Harlan Scott,** Pacific Pulp & Paper Industry, Seattle; **Fred Shaneman,** Pennsylvania Salt Mfg. Co. of Washington, Tacoma.

• **W. J. Shelton,** Longview Fibre Co., Longview; **D. L. Shirley,** Link-Belt Co., Portland; **Anton P. Siebers,** Longview Fibre Co., Longview; **C. Wylie Smith,** Coos Bay Pulp Corp., Empire; **Ray Smythe,** Rice Barton Corp., Portland; **Paul J. Thiess,** Longview Fibre Co., Longview; **V. L. Tipka,** Hawley Pulp & Paper Co., Oregon City; **R. M. True,** General Dyestuff Corp., Portland; **G. R. Vernig,** Pulp Division, Weyerhaeuser Timber Co., Longview; **R. O. Vognild,** Hooker Electrochemical Co., Tacoma; **J. B. Ward,** Hooker Electrochemical Co., Tacoma.

• **Harold C. Wall,** Longview Fibre Co., Longview; **Samuel Weiss,** Vaughan Motor Co., Portland; **Fred J. Welebar,** Hawley Pulp & Paper Co., Oregon City; **Rex L. West,** Longview Fibre Co., Longview; **J. M. Wilcox,** Electric Steel Foundry, Portland; **Zina A. Wise,** Griffith Rubber, Seattle; **Edward P. Wood,** Pulp Division, Weyerhaeuser Timber Co., Longview.

Kenneth Chapman Called To Active Naval Duty

• Kenneth Chapman, chief chemist, Everett Mill, Pulp Division, Weyerhaeuser Timber Company, since December 1st, was called to active duty with the Navy on March 1st. On board the U. S. S. Saratoga it is now Lieutenant Chapman, J. G.

Some of the Weyerhaeuser men staged a farewell party for Lieutenant Chapman at the Hotel Monte Cristo on February 25th. A gladstone bag was presented as a token of friendship from the men in the Technical Department. Entertainment was provided by a musical trio made up of Walter Clough at the piano, Rowell Paine on the trumpet and Paul Pittenger on the banjo.

The following men from the Everett mill attended the party: G. S. Brazeau, Russell J. LeRoux, Walter Clough, Gerald F. Alcorn, O. E. Fox, D. K. MacBain, Harold Brown, R. O. Silliman, Rowell Paine, Corwin Knapp, Bill Juntila, Dick Colburn, Eldon Merrill, Al Graef, Del Gerry, Harold Griep, Gordon Raught and Paul Pittenger.

Weyerhaeuser Men Make Changes

• Two project chemists left the Longview Mill, Pulp Division Weyerhaeuser Timber Company about the first of March. L. E. Stevenson transferred to the Everett mill and Morris Peterson resigned to take a position with the Aluminum Company of America, at Vancouver, Washington.

AT THE LONGVIEW TAPPI DINNER . . . Dr. WALTER F. HOLZER, seated, who spoke on "Botanical Studies of Pulp by Means of Chemical Swelling," and CARL E. BRAUN, Vice Chairman of the Pacific Section of TAPPI, who presided.

Pollution Bill Dies in Committee

● The anti waste liquor dumping bill introduced into the Washington State Senate on February 19th by H. N. Jackson of Pierce County and designated Senate Bill No. 287, died in the Rules Committee.

The bill stated, "An act relating to the preservation, protection and perpetuation of food fishes and shellfish, and prohibiting the pollution of the waters of Puget Sound from pulp mill waste, and prescribing penalties:

Section 1. That it shall be unlawful to cast or pass, or to suffer or permit to be cast or passed, any pulp wood, pulp liquor or other pulp waste into any waters of Puget Sound (as described in section 5669 of Remington's Revised Statutes) East of a straight line extending due north from the New Dungeness Light, Clallam County, Washington, and any person, firm or corporation violating this act, or any person aiding and assisting therein, shall be guilty of a gross misdemeanor."

The following Monday an unexpected hearing was held by the Senate Fisheries Committee to which the bill had been referred. Sports fishermen, sports writers, sporting goods store owners and an oyster grower appeared to be the principal backers. The pulp industry, unaware of the hearing until the last moment, was represented by two attorneys. The Fisheries Committee voted favorably on the measure, passing it on to the Senate Rules Committee which has the power to place bills on the calendar.

The bill was drawn by persons unfamiliar with the industry and to a pulp man the measure is obviously impractical.. It developed that the idea behind the measure was to force the pulp mills to barge their waste liquor out to the entrance of the Straits of Juan de Fuca in the hope that the waste would be carried out to the Pacific Ocean.

A little figuring soon showed that all the barges, tanks and tugs on Puget Sound could not begin to handle the waste liquor freight movement which it was estimated would amount to around 800,000 tons every 24-hours, almost all water. The proponents of the measure then decided to attempt to amend the bill to require that only "strong waste liquor" had to be so dumped. However, it could not be amended unless reported onto the Senate floor so the amendment was held in abeyance. This idea was likewise impractical from an operating standpoint.

Protests flooded the Rules Committee stating that this bill if enacted would shut the industry on Puget Sound down indefinitely throwing thousands of people out of work in the industry itself and among supplying concerns. The pulp mill union locals protested, building trades unions protested, chemical companies protested; the pulp mills protested and explained the unworkability of the measure. The waste liquor matter was explained to the members of the Senate. They were told of the research being carried on in many places in an effort to find a way to use the lignin in the waste liquor so that it can be disposed of without excessive taxing of the revenues of the pulp mills.

As a result Senate Bill 287 was still in the Rules Committee at noon on March 9th the deadline beyond which neither the Senate nor the House of Representatives can consider their own new bills. Thereafter until the end of the session they had to consider each other's bills.

Fernstrom Installs Broke De-Inking System

● A new de inking system has been added at the Fernstrom Paper Mills, Inc., at Pomona, Calif. The system utilizes some abandoned beaters and is used to de-ink an de-oil, printed and oiled citrus wrap broke. Soda ash and caustic soda are used in the de-inkers. The broke had been sold previously for a small amount. The de-inker system now puts it back into productive use.

The mill is expecting to install a new 250-hp. steam turbine in another ten weeks.

Plans are being discussed for the replacement of the entire drive on No. 2 machine. With the improvements noted the machine will be able to manufacture up to 1,000 feet of tissue paper per minute. A new Babcock and Wilcox 400-hp. boiler will be installed also.

Paul Pittenger New Weyerhaeuser Chief Chemist

● On March 1st Paul A. Pittenger took over the duties of chief chemist for the Everett Mill, Pulp Division Weyerhaeuser Timber Company, succeeding Kenneth Chapman who was called to active duty with the Navy.

Mr. Pittenger graduated from Washington State College in 1933 with his degree in chemical engineering. In 1934 he joined the technical staff of the Longview Mill, Pulp Division, as a tester progressing to grader and shift chemist. When the Everett mill was completed in 1936 Mr. Pittenger became project chemist for the unbleached producing unit of the Weyerhaeuser organization.

He is married and has two children, is enthusiastic about flying and photography, and also finds time to edit "Chips," publication of the Weyerhaeuser Credit Union.

PAUL A. PITTENGER, Chief Chemist, Weyerhaeuser Everett Mill

Fernstrom Paper Mills Reelects Officers

● At the annual meeting of the stockholders of the Fernstrom Paper Mills, Inc., of Pomona, Calif., officers of the previous fiscal year were re-elected for the new year. F. O. Fernstrom continues as president, J. W. Genuit, vice-president and general sales manager; J. E. Maurer, vice-president and treasurer; D. P. Nichols, secretary; F. W. Scrimes, assistant secretary-treasurer. The board of directors is composed of F. O. Fernstrom, Eric Fernstrom, H. G. Miller, J. E. Maurer and Walter Johnson.

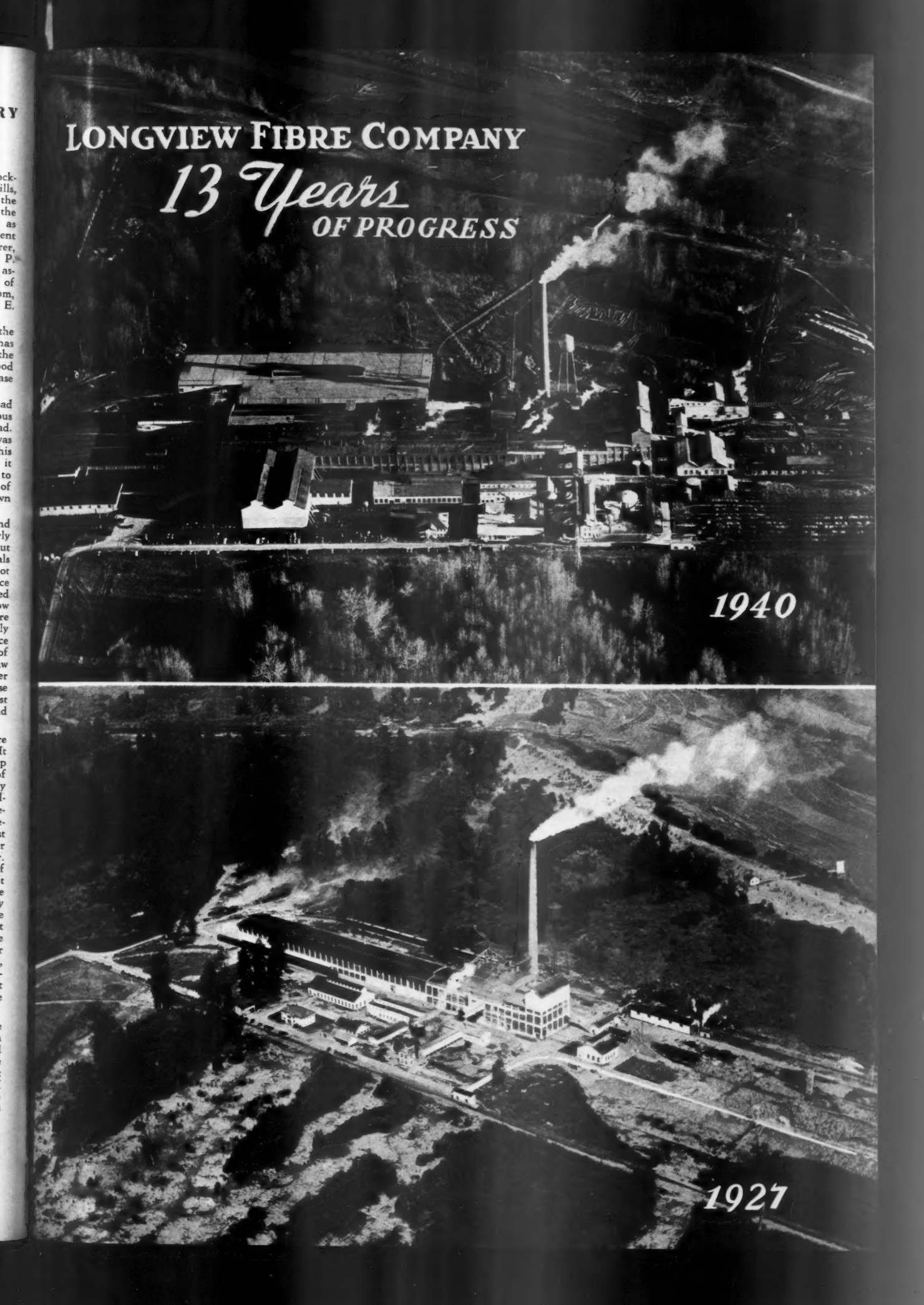
Mr. Fernstrom in his report to the stockholders stated, "The year 1940 has been the most profitable year of the company's existence. Export sales at good prices have helped materially to increase profits.

"As we survey the year that lies ahead our vision is obstructed by the calamitous events transpiring at home and abroad. Never in the history of the world was the future less predictable than in this year of 1941. In these uncertain times it is only natural that we should hold to those things that we recognize to be of proven value, rather than the unknown and the untried.

"There has been a steady upward trend in the cost of raw materials, particularly pulp, which has increased in price about 33 per cent; however, other raw materials have kept to a level at which we are not seriously hurt. During all the years since the paper mill was built I have dreaded times like those with which we are now faced . . . paper mills like ours, that are dependent on outside sources of supply for pulp some time during their existence will find themselves with a high cost of production due to increased prices of raw materials. But the price on finished paper does not necessarily follow the increase in the cost of production, which is just exactly the position in which we now find ourselves.

"I hesitate to predict or guess where the pulp prices may become stabilized. It is, however, my guess that the pulp prices will not be allowed to get out of control. The government has already taken a hand in the pulp situation, allowing the pulp manufacturers to receive a fair profit . . . Therefore, I believe that for the near future, or at least 1941, the price will not be higher in our instance than $60.00 a ton at the harbor. For some unforseen reason the price of paper in the domestic market has not increased any appreciable amount. The reason might be that the paper industry feels that now is the time to regain the domestic market for itself and shut out importations when the war is over. The prices today are controlled by the paper mills that manufacture their own pulp, and the reason for the absence of increases in prices of paper products might be that those mills feel that they are making ample profit.

"I believe we all realize that when the war comes to an end, before we can reckon with normal conditions, we will have in between a period that will give us, and the industry as a whole, a great shock. The Federal Administration, I understand, has already taken steps to cushion the shock to reduce as much as possible the resulting calamity. However, we should not depend upon what the administration is able to do . . . we should consistently exert every effort to keep the company as liquid as possible."


LONGVIEW FIBRE COMPANY
13 Years
OF PROGRESS
1940
1927

WASTE WOOD--a Challenge That Built the Longview Fibre Company

WASTE utilization is a phrase frequently encountered in the timber growing regions of the United States. Wood using industries have wrestled with the problem of waste wood utilization for many years, spending great sums of money in efforts to find chemical and mechanical means of giving greater value to the wood that is left after the primary wood users have extracted all that they can take economically.

Industry and the general public have looked upon refuse wood as a problem to be solved but from different viewpoints. Industry has believed that chemical and mechanical ingenuity ought to eventually find ways to use the waste at a profit, while the general public has, by and large, looked upon the waste wood as an example of industry's profligacy in handling abundant raw materials. The latter viewpoint is born of a lack of knowledge of the facts.

Waste wood, whether it be in the woods or at the sawmill, is only waste because economic factors prevent its being converted into saleable products at a profit. It is in relatively small pieces which raises handling costs to a high level, far higher than the costs of handling the larger pieces of wood. If the selling prices of the finished products cover the higher handling costs of the small wood, it is utilized profitably. Otherwise it can only be used as fuel and in many instances even this outlet does not exist.

WASTE DOUGLAS FIR from the adjacent sawmills of the Long-Bell Lumber Co. was the raw material foundation upon which the first unit of the Longview Fibre Company was built.

In its 13 years of operation the Longview Fibre Company has pulped over 625,000 cords of Douglas fir refuse, giving value to wood otherwise unmarketable or of negligible worth as fuel.

Above is the company's present pile of fir mill ends to be used for groundwood filler pulps after steaming in retorts to eliminate the tendency of the resin to gum the stones and wires. Fir waste, chipped at the sawmills is used for sulphate pulping along with Western hemlock logs.

More waste or refuse wood is utilized profitably than is generally realized. Waste is far from being eliminated but steady progress is being made.

A major converter of waste wood into profitable products in the Pacific Northwest is the Longview Fibre Company of Longview, Washington. In October, 1940, the company completed its thirteenth year of waste wood utilization in the production of kraft and groundwood pulps, papers and boards.

At the time the first large sawmill unit of the Long-Bell Lumber Company was completed in 1924, part of the refuse wood was used in the form of hogged fuel to produce steam and electric power for sawmill operations. Another part was sold in Longview and vicinity as household fuel. But these outlets were insufficient markets for the large quantities of refuse wood produced by the big sawmill. The remainder of the refuse wood was burned in a typical burner producing nothing and, in fact, levying a tax upon the Long-Bell operations for refuse burners are expensive to maintain.

The late M. A. Wertheimer, president of the Thilmany Pulp & Paper Company of Kaukauna, Wisconsin, saw this waste wood being burned. His imagination was stimulated and he visualized the possibilities of utilizing it in the manufacture of kraft papers and boards with the accompanying steady employment for a large number of men and women.

He accepted the challenge of this great volume of Douglas fir sawmill waste and went to work. He arranged for the shipment of a trainload of Douglas fir sawmill waste to the Thilmany mill at Kaukauna early in 1925. Experimental work in the pulping of Douglas fir by the sulphate method was laid out. A new path was being cut for Douglas fir had not been used up to that time in the commercial production of kraft board, although it had been used for many years along with cottonwood in the soda process for the manufacture of book papers.

At Kaukauna the Douglas fir refuse was processed by the sulphate method and the resulting pulps were made into a variety of products from various types of light and heavy wrapping papers, container liners, to bleached papers. Some of the experimental pulp was shipped to Ontonagon, Michigan, where the Ontonagon Fibre Company converted it into container board. These experiments which occupied the greater part of 1925 proved successful, so Mr. Wertheimer went ahead with his plans for organizing a company and building a kraft pulp and board mill at Longview adjacent to the sawmills of the Long-Bell Lumber Company.

As these experiments had been carried out on a full scale basis it was possible to transfer the knowledge gained directly to the blueprints for the new mill. Planning of the Longview Fibre Company's mill began at Kaukauna early in 1926. C. R. Seaborne, then chief engineer for Thilmany, was loaned by the latter company and placed in complete charge of design and later of construction. Assisting him as chief construction engineer was W. E. Dodge, who remained at Longview as resident engineer until his death several years ago.

The first pile was driven early in 1927 and nine months later on October 3rd, the first digester was blown. In the December, 1927, issue, PACIFIC PULP & PAPER INDUSTRY said:

"In several respects this mill is an outstanding Pacific Coast development. It marks the high type of present day pulp and paper engineering. It was constructed in record time. It is designed to pulp Douglas fir waste wood exclusively. And, conceived and brought to realization principally by men connected with the Thilmany Pulp and Paper Company of Kaukauna, Wisconsin, it marks the entry of Eastern pulp and paper capital and talent into the Pacific Coast field.

"The Longview Fibre Company officials set out several reasons for locating the new mill at Longview. Chief among these is the advantage of being situated on a site which adjoins the largest lumber mill in the world—that of the Long-Bell Lumber Company, cutting 1,800,000 feet per day—nearly all Douglas fir.

"The Long-Bell Company owns billions of feet of Douglas fir and has been built on a permanent basis to operate over a long period of years, perhaps on such a scale as never attempted by any other lumber mill up to the present time. This situation, with favorable long time contracts for wood, forms the primary reason for locating the pulp mill at Longview. Other advantages enjoyed by the Longview fibre mill are deep sea shipping to its doors, adequate rail service connecting with main line roads, and plentiful and accessible water supply.

"The 180-acre site of the mill is perfectly level, a deep sand and gravel formation at the confluence of the Columbia and the Cowlitz Rivers, 50 miles below Portland, Oregon, or approximately half way between that city and the open sea."

The original mill, shown in the photograph on the frontispiece, consisted of four 5-ton stationary digesters, three Wagner furnaces, a hogged fuel steam plant and a 140 tons per day Black-Clawson cylinder board machine.

Second Machine Installed in 1928

● Before the Longview Fibre mill started in October of 1927 an order was placed with the Beloit Iron Works for a 172-inch Yankee paper machine. Installation was completed in June of 1928. When the original mill was constructed the machine room was designed to accommodate the second machine. The Yankee cylinder is 12 feet in diameter and at the time was the largest Yankee machine ever built.

The Yankee machine has been in constant operation since June, 1928, producing light weight M. G. wrapping, bag, asphalt and a general line of kraft papers.

General Fibre Box Acquired

● In 1929 the assets of the General Fibre Box Company of Springfield, Massachusetts, were purchased by the Longview Fibre Company, and C. J. Shoo, who operated the plant, was made vice president of the Longview Fibre Company in charge of Springfield operations. Test liner and corrugating board are shipped in rolls by water to Boston and then trans-shipped by rail or truck to the container making plant at Springfield.

No. 3 Installed in 1932

● In 1932 No. 3 paper machine was brought into operation. This machine was a Minton Vacuum Dryer on which experimental work in the use of solvent sizing was contemplated. After many months of experimenting with the process, it was decided that the machine would be run as a conventional fourdrinier and has been so operating ever since with a production of about 40 tons per day. On No. 3 machine a variety of kraft wrappings are made in both bleached and unbleached grades and in basis weights from 20 to 120 pounds.

Steamed Groundwood

● During this period of early operation experimental work was being conducted in the use of steamed groundwood as a filler in container board in place of mixed waste paper, at that time commonly used in making jute liner.

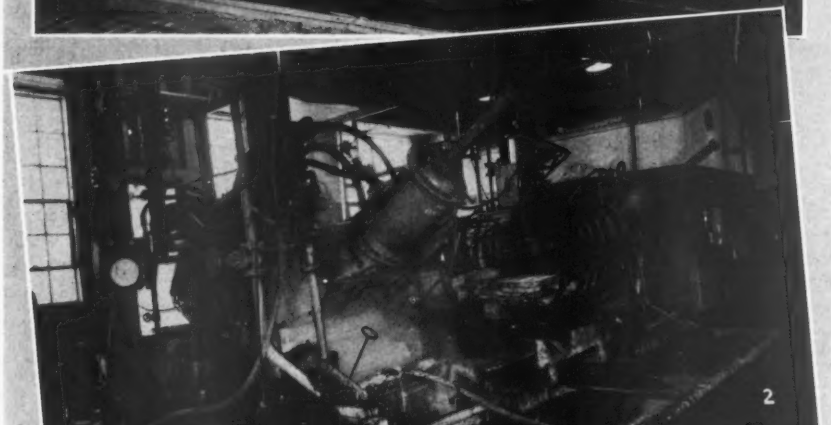
It was found that the steamed groundwood fiber gave a more uniform and predictable result in the production of test liner than the use of mixed waste. Experimental work was also conducted in the production of .009 corrugating board on the cylinder board machine and the results obtained when using a furnish largely composed of steamed groundwood was found to give a suitable product.

Results in No. 4 Machine

● The success of the steamed groundwood experiments led to the ordering of No. 4 machine, a 5-cylinder Beloit board machine. No. 4 began operations in June of 1934 and its primary product ever since has been .009 corrugating board of steamed groundwood, but other grades are also made on No. 4 such as light weight test and non-test liner. Its capacity ranges from 70 to 80 tons daily.

Along with the installation of No. 4 came the expansion of the groundwood mill to 100 tons per day. Douglas fir waste wood, steamed to eliminate the tendency of its resin content gumming stones and wires, proved entirely satisfactory.

The placing of No. 4 machine into operation brought about expansion of the digester department. A fifth digester was added to provide additional kraft pulp for the four hungry paper and board machines. Another important improvement installed at this time was a Cottrell



Precipitator for the recovery of sodium salts contained in the recovery flue gases.

Converting Expanded

● Around the time No. 4 machine went into production in 1934 the converting operations were enlarged. The bag plant, started in 1928, was considerably increased as well as the box plant which had started operations in 1930. Early in 1934 a towel converting operation was placed in operation with a capacity of substantially ten tons a day.

Although asphalted papers had been made from 1928 on, this process was gradually improved and developed as an important adjunct to the other converting operations.

In 1937 the company installed a bleach plant of 60 tons daily capacity. This plant is capable of making all grades of manilas and high white kraft papers.

Additional digesters, which brought the total up to eight, were installed in 1938 and 1939, and the kraft pulp capacity was raised to around 300 tons per day. At the same time two Tomlinson furnaces, one of 100-ton capacity and the other of 150-ton capacity, were placed in operation. Additional evaporating equipment was added to balance the pulp output. The new digesters were equipped with Electric Steel Foundry Company's stainless steel heaters and strainers. Stainless steel valves were purchased from the Vaughan Motor Company, also of Portland, Oregon.

No. 5 Paper Machine Ordered

● The Longview Fibre Company's new No. 5 paper and board machine was ordered from the Beloit Iron

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No. 1, Cars of special design bring waste fir chips from the nearby sawmills. In the background is the log pond and dike and beyond the Columbia River. Hemlock logs are pulled over the dike into the pond by a donkey engine. Hemlock logs are cut into short lengths, split, barked and chipped.

No. 2, Two of the grinders for producing groundwood filler pulps from steamed Douglas fir waste. Note the small pieces utilized.

No. 3, A part of the new diffuser building with the digester operating floor in the background.

No. 4, On the left is the No. 1 machine, a Black-Clawson cylinder board machine installed in 1927. On the right is the No. 2 machine a Beloit Iron Works Yankee machine for producing MG papers.

Works in March, 1940. With a wire 200 inches in width the machine is capable of producing from 100 to 150 tons of paper or board per day depending upon the grade being run. Installation was completed in December, 1940.

Thirteen Years of Progress

● On October 3rd, 1940, the Longview Fibre Company's mill at Longview, Washington, completed thirteen years of steady operation. It had grown from a one machine board mill to a five machine paper and board mill with an extensive converting department.

The growth in productive capacity had greatly increased the number of men and women employed. At the start in 1927 approximately 350 persons worked for the company. Thirteen years later the total was over 950. The contribution of the industry to the well-being of the citizens of Longview is obvious. Assuming three to a family, the mill originally supported 1,050 people. Today, it supports 2,850 people. This is direct employment. The indirect contributions to the community and to the Pacific Northwest cannot be accurately estimated but they are of equal or greater importance. The volume of wood, of chemicals, of felts, wires, equipment bought, has grown along with productive capacity. Hundreds of people are indirectly deriving their livelihood from the successful operations of the Longview Fibre Company.

At the beginning, the mill produced about 120 tons of kraft test liner per day. Now the production averages around 400 tons daily of board and papers. Pulp production is divided, 300 tons of kraft and 75 tons of groundwood pulp per 24 hours.

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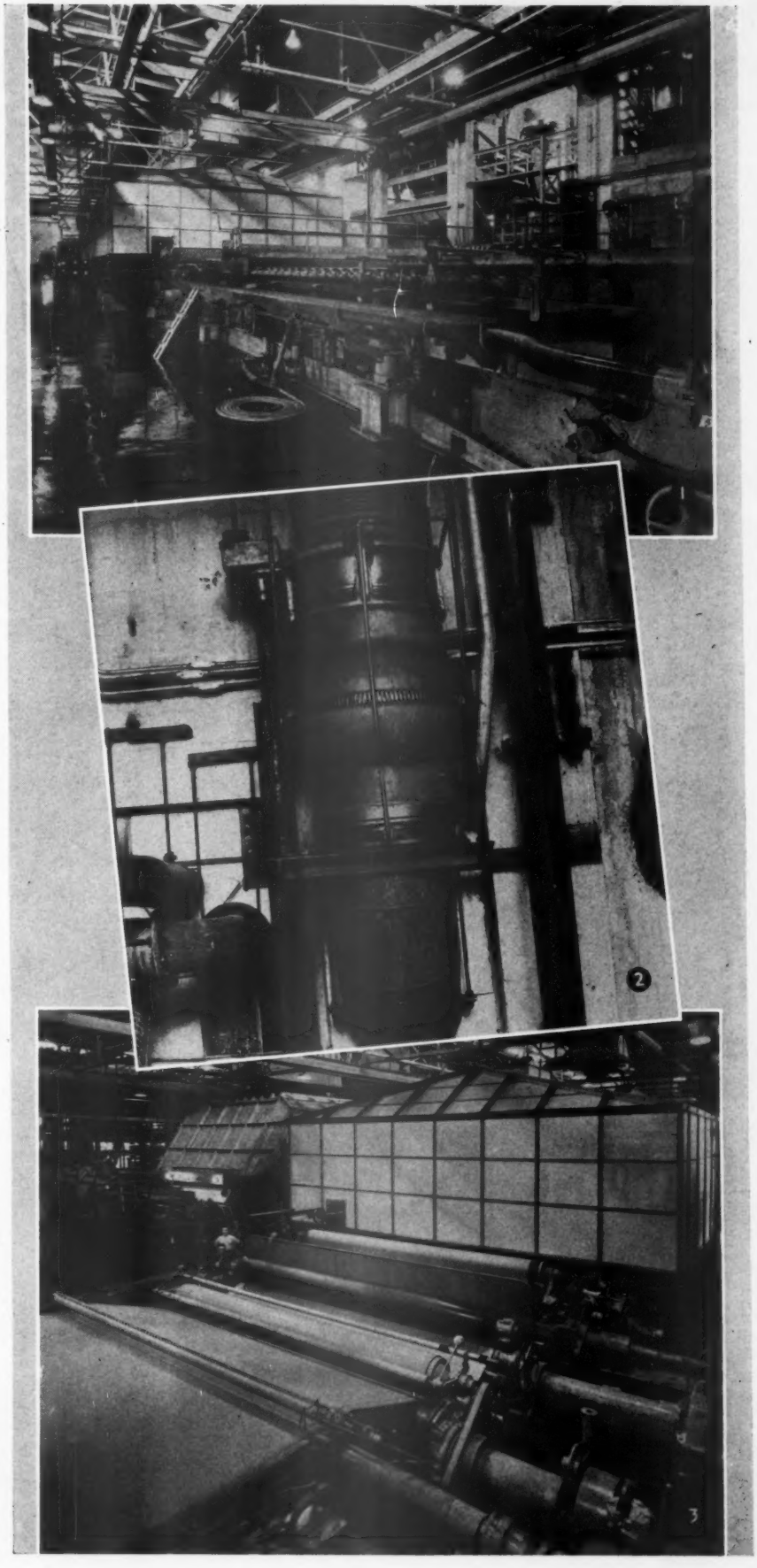
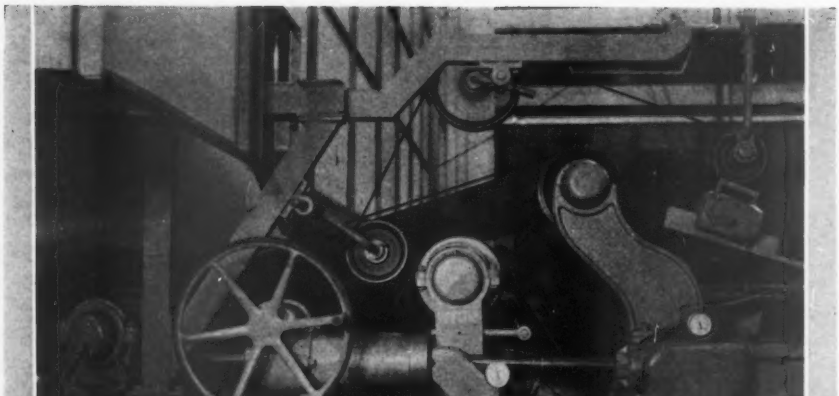
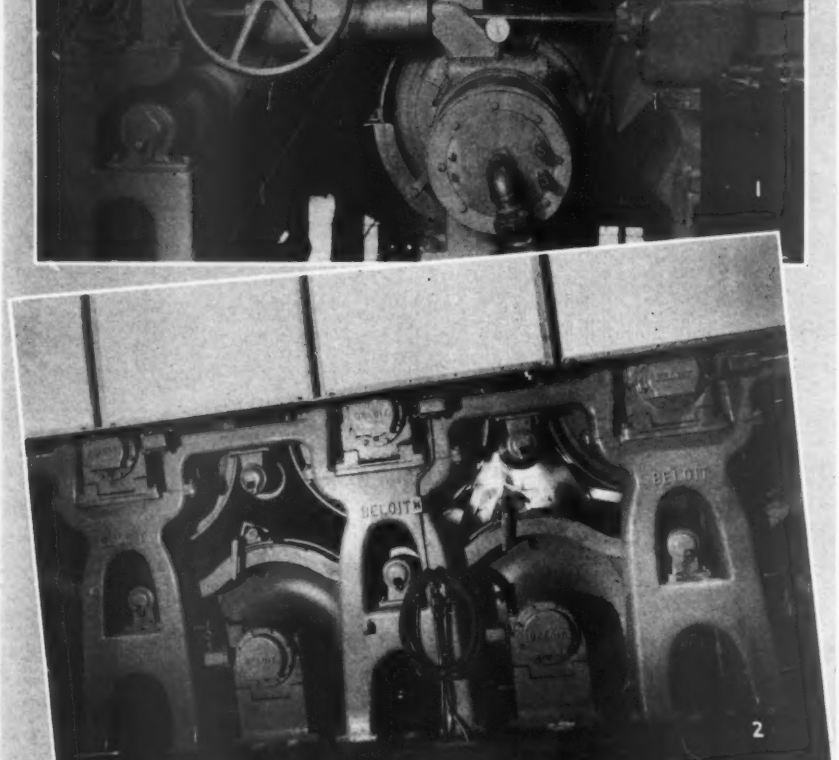


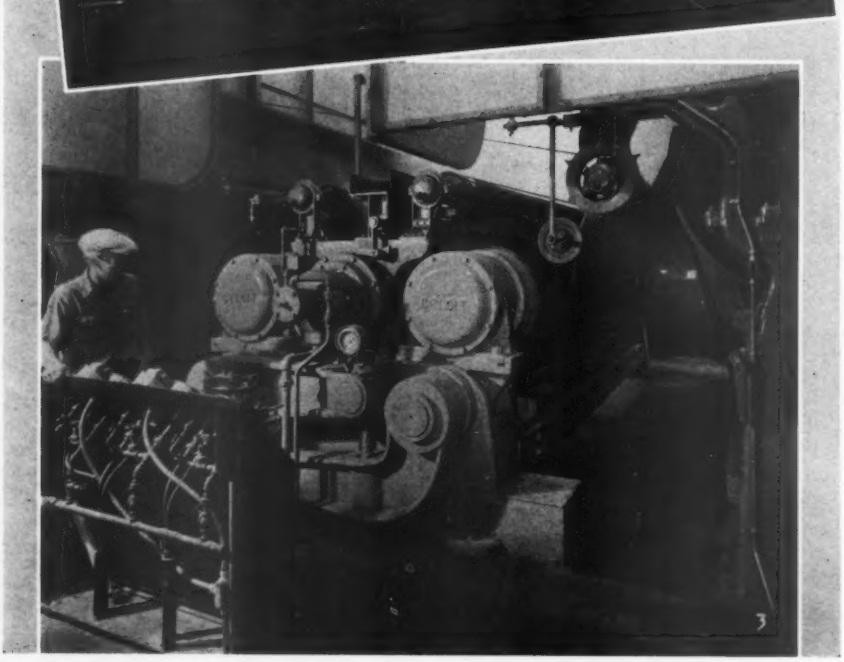
No. 1, General view of the new Beloit No. 5 paper and board machine which began operation in December, 1940. Removable fourdrinier in foreground. Corrosion resistant metals used throughout, main fourdrinier beams being covered with stainless steel.

No. 2, Special streamlined valve in piping between screen box and Flow Evener. Used to control head on the slice. Pipe is 24 inches in diameter.

No. 3, View from back side of No. 5 at suction couch, showing fourdrinier suction boxes, couch lump breaker roll and dual press. No. 4 cylinder machine in background.







Successful Waste Utilization

● It must be kept in mind that the Longview Fibre Company was founded because the late M. A. Wertheimer saw the opportunity of turning waste Douglas fir from the Long-Bell Lumber Company's sawmills into usable products. Waste fir still remains a basic raw material. In the thirteen years of operation the mill has consumed over 625,000 cords of Douglas fir refuse wood. In the same period it has consumed approximately 500,000 cords of Western hemlock logs, thus giving value to a species considered of little worth by the lumbermen before the development of pulp making in the Pacific Northwest.

Officers and Staff

● The officers and staff of the Longview Fibre Company are as follows:

H. L. Wollenberg, president; **C. J. Schoo,** vice president; **D. Clark Everest,** vice president; **R. S. Wertheimer,** vice president and resident manager; **L. C. Peabody,** secretary-treasurer; **C. R. Adams,** assistant treasurer; **R. G. Armstrong,** assistant secretary.

Carl Fahlstrom, assistant resident manager; **Herman Hoehne,** pulp mill superintendent; **A. P. Siebers,** paper mill superintendent; **William W. Clarke,** assistant paper mill superintendent; **M. V. Roley,** bag plant superintendent; **C. J. Page,** box plant superintendent; **W. D. Rigg,** engineer; **J. A. Wilcox,** process engineer; and **W. E. Thompson,** construction superintendent.

Thirteen Year Employees

● Sixty-six employees who joined the Longview Fibre Company in its first year are still a part of the organization. These men and women pioneer employees and their present occupations are listed below:

R. R. Alston, head recovery fireman; **L. A. Anderson,** cook; **Gebhart Becker,** pipefitter foreman; **F. E. Bray,** millwright, class A; **B. S. Brekke,** millwright, class A; **D. H. Cairns,** chief clerk, paper department; **J. G. Carson,** pulp mill tour foreman; **Frank Chalupa,** electrician, class A plus; **H. W. Dauterman,** paper mill tour foreman; **C. G. Ditter,** chief clerk, bag plant.

J. L. Doble, millwright, class A; **H. J. Drew,** paper mill tour foreman; **O. A. Dudonsky,** machine tender; **C. J. Dupras,** paper mill tour foreman; **Carl Fahlstrom,** assistant resident manager; **F. W. Findley,** electrician, class A plus; **W. T. Fisher,** machine tender; **C. E. Flanders,** ma-

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No. 1, Closeup at second press of Beloit Dual Press. Note pressure unit with sensitive gauge on right indicating pressure. Start of rope carrier system shown.

No. 2, View of dryer section from front side showing doctors and accessibility at both front and back sides.

No. 3, Special marking and smoothing press between the two separate dryer sections.

chine tender; **Joe Fotheringill,** safety engineer; **A. J. Gillen,** machine tender.

R. H. **Gillen,** machine tender; **J. T. Gunn,** welder, class A plus; **R. G. Harris,** painter, class A plus; **C. W. Hill,** head beaterman; **V. H. Hill,** head beaterman; **H. F. Hoehne,** pulp mill superintendent; **F. A. Horn,** maintenance millwright foreman; **O. W. Hughes,** millwright, class A; **M. V. Johnson,** millwright, class A; **R. A. Johnson,** machine tender.

L. W. Johnston, cook; **T. E. Karnoski,** machine tender; **R. O. Lair,** head beaterman; **J. L. LaPointe,** pulp mill tour foreman; **I. L. Lee,** machine tender; **S. J. Maunus,** cook; **M. A. McCallum,** machine tender; **J. W. McKinnis,** blacksmith, class A; **W. A. Medack,** millwright, class A; **T. O. Mendenhall** scheduling service, paper department; **C. J. Miller,** machinist, class A.

E. E. Miller, machinist, class A plus; **C. G. Moon,** locomotive engineer; **E. H. Myren,** millwright, class A; **Alden Ortwein,** welder, class A plus; **L. C. Peabody,** secretary-treasurer and assistant to the president; **F. L. Plant,** pipefitter, class A plus; **A. E. Ridling,** head fireman; **W. D. Rigg,** chief engineer; **C. H. Russell,** carpenter, class A; **H. E. Samples,** head recovery fireman.

J. W. Schuh, chief electrical engineer; **H. S. Shreve,** pipefitter, class A; **A. P. Siebers,** paper mill superintendent; **R. T. Silvey,** millwright, class A; **J. I. Skalitzy,** electrician, class A plus; **Helen Skaug,** bookkeeping machine operator; **G. K. Smith,** millwright, class A; **H. M. Sorenson,** electrician, class A; **W. E. Thompson,** construction superintendent.

E. S. Umland, finishing room superintendent; **W. J. Vandinter,** cook; **Dave Watson,** purchasing agent; **W. A. Wenzel,** pulp mill tour foreman; **R. S. Wertheimer,** vice president and resident manager; and, **H. L. Wollenberg,** president.

Blake, Moffitt & Towne Distributors

● Blake, Moffitt & Towne, pioneer jobbers of paper on the Pacific Coast with headquarters in San Francisco and offices and warehouses throughout the western states, have been major distributors of Longview Fibre papers and paper products since the early operation of the plant.

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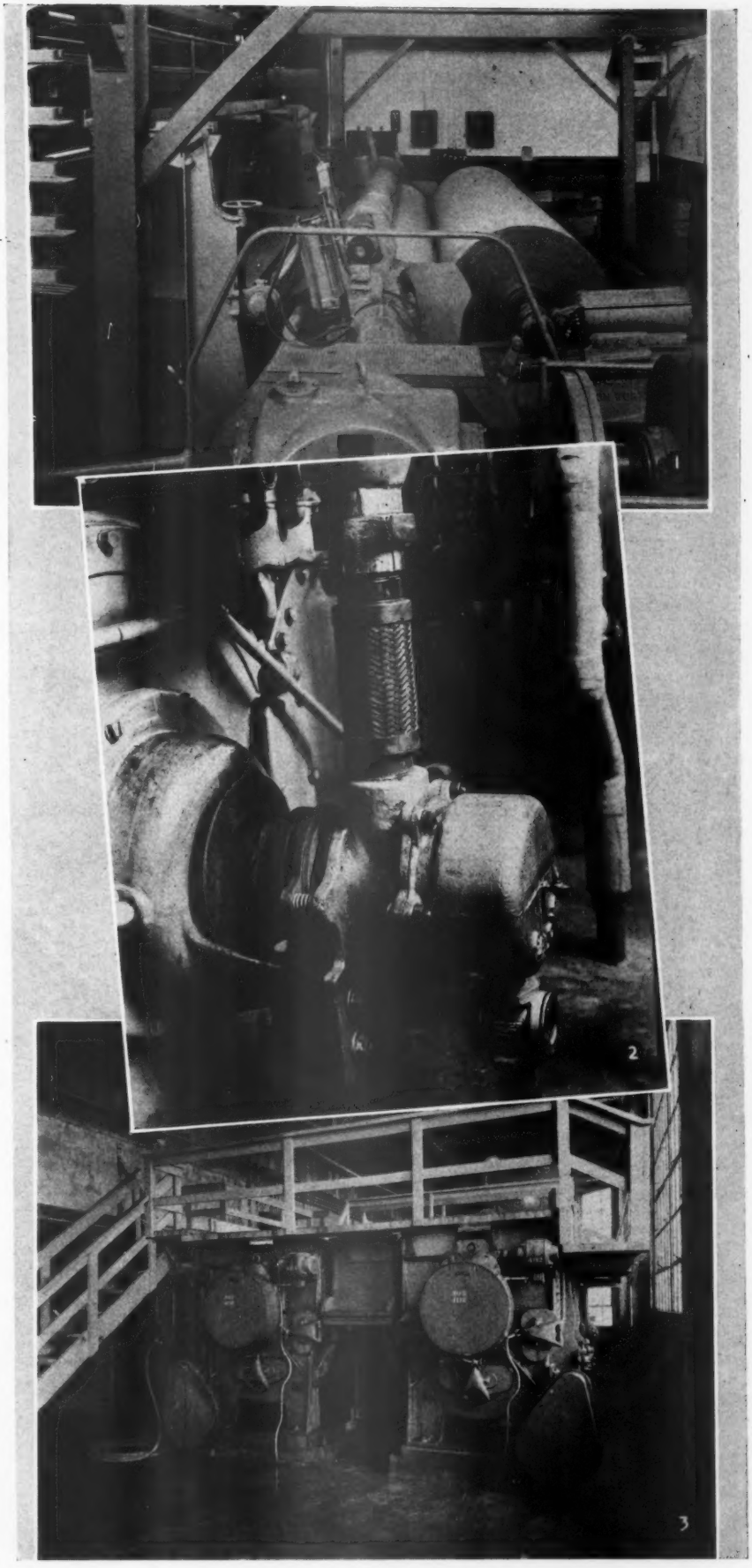
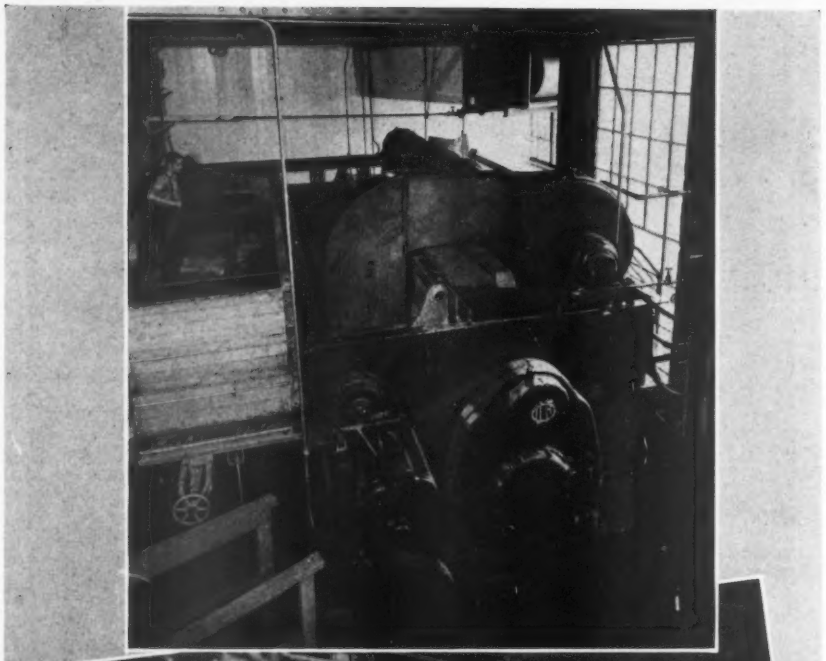
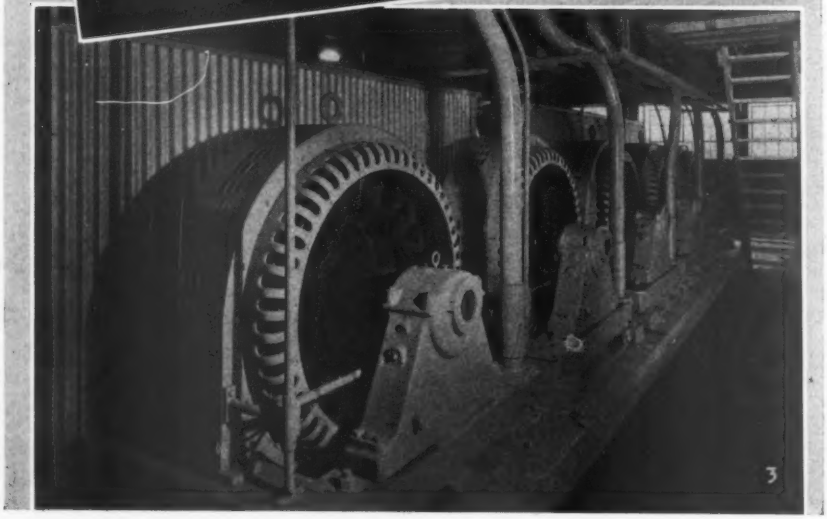


No. 1, Beloit heavy duty kraft type reel. Note cylinder for controlling reel spool in both starting and finishing positions. Also hypoid drive unit with Beloit mechanical clutch.

No. 2, Closeup of Beloit balanced dryer steam fit used in connection with high speed condensate remover. Note Visi-Flow fitting in condensate piping used in connection with Fulton Dryer Drainage System, to permit operators to see condensate removal.

No. 3, Ends of two of the four 3-A Bird Dual Drive Screens on balcony alongside of fourdrinier. The other two screens are directly back of the two showing.





Products of Longview Fibre Company

Pulp

Western Hemlock Sulphate Pulp in Rolls and Sheets.

Sulphate Board

Cylinder Test Liner
Cylinder Non Test Liner
Fourdrinier Test Liner
Cylinder Corrugating Board
Fourdrinier Corrugating Board
Cylinder Boxboard
Kraft Liner for Wrapping Veneer Wallboard
Board Lined with Kraft Papers
Duplex Kraftlined Asphalted Board
Waxed Board

Combined Board

Test Corrugated Sheets, A Flute and B Flute
Non Test Corrugated Sheets, A Flute and B Flute
Solid Fibre Sheets

Kraft Paper

Plain and Watermarked, Printed and Unprinted, Natural, Colored, Semi-Bleached and Full Bleached

Machine Glazed

Wrapping
Bag
Gumming Kraft
Tire Wrap
Bakers' Manila
Envelope

Fourdriner Machine Finished

Wrapping
Bag
Butchers
Gumming Kraft
Tire Wrap
Envelope Kraft
Multiwall Bag Papers
Tile Mounting Kraft
Laundry Manila
Blue Laundry
Pattern Paper
Macaroni Paper
Drug Bond
Orange Hardware
Bakers' Manila
Brushkraft
Raisin Tray
Battery Paper
Spinning Kraft
Cheese Curing
Cartridge

Duplex Asphalted Waterproof Paper Products

Sheathing Paper
Car Liner
Multiwall Bag Liner
String Inserted Celery Bleaching Paper
Asphalted Specialties

No. 1, Oliver 8-foot diameter by 16-foot face saveall on balcony alongside of fourdrinier section.

No. 2, Four of the five L-9 Nash vacuum pumps driven by Westinghouse 225 h.p. synchronous motors, providing vacuum for couch suction presses and suction boxes.

No. 3, The five Westinghouse 500 h.p. synchronous jordan motors direct connected to the No. 5 Shartle Miami Jordans.

Paper Towels

Kraft, Sulphite and Full Bleached

Interfolded Paper Towels—
- Singlefold
- Doublefold
- Fourfold
- Singlefold Duplex

Harcraft Paper Towels
Roll Paper Towels
Duplex Roll Paper Towels
Household Paper Towels

Creped Paper Products

Plain Crepe Kraft
Asphalted Crepe Kraft
Waxed Crepe Kraft
Ham Wrap

Waxed Paper Products

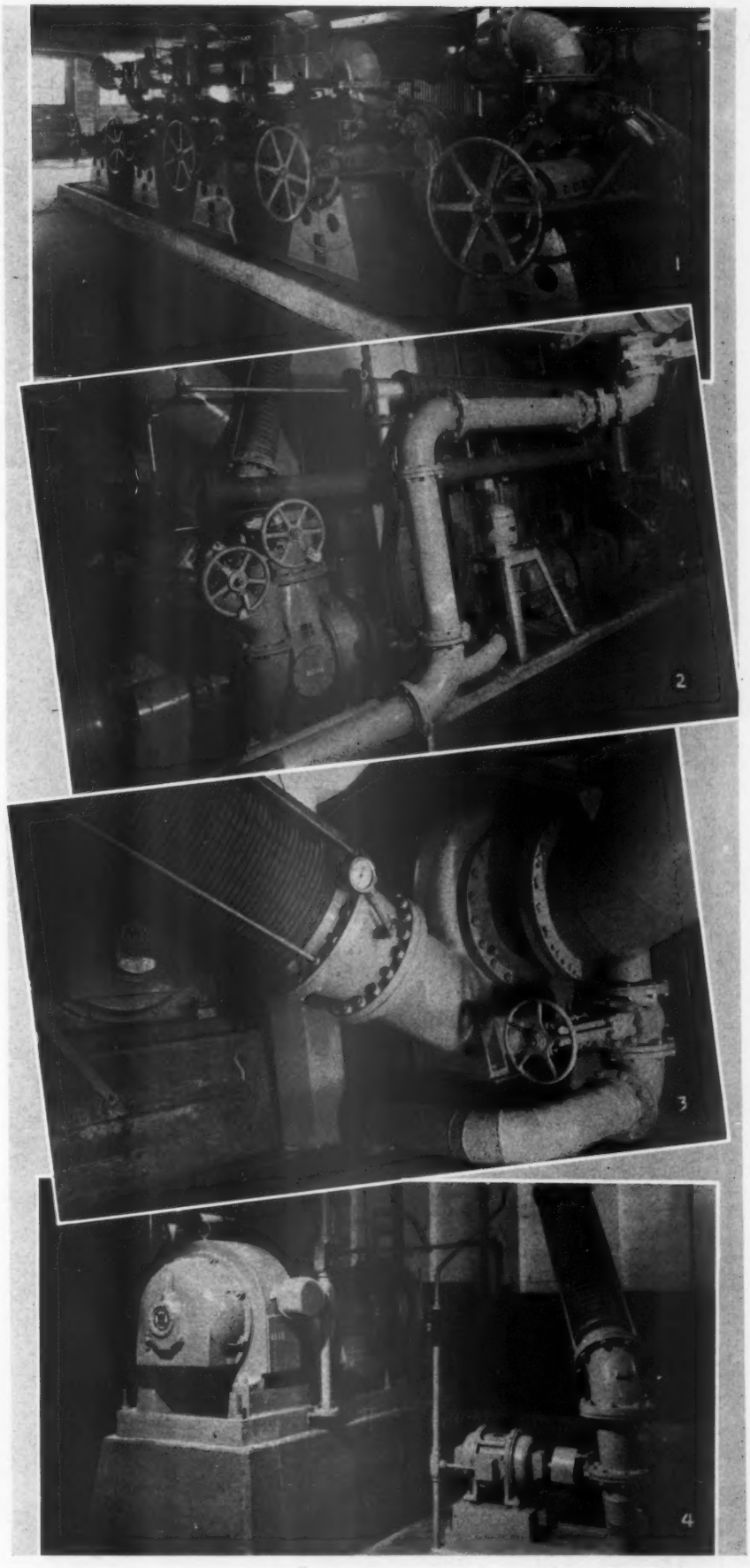
Delicatessen Paper
- Semi-Bleached
- Full Bleached

Lettuce Crate Liners
Newspaper Wrap
Powder Box Liners
Waxed Specialties

Kraft Bags

Plain and Watermarked, Machine Glazed and Machine Finished, Printed and Unprinted, Single and Duplex Walls, Plain, Waxed and Asphalted, Sewed Creped, Flat, Self-Opening, Satchel Bottom, Square and Tube Styles

Grocery
Notion and Millinery
Garment
Pants
Barrel
Poultry
Nail
Laundry
Cigarette Carton
Doughnut
Liquor
Shopping
Carryall
Beverage
Bread
Confectionery
Pop Corn
Sugar
Raisin
Prune
Shot
Opaque Drug
Paper Milk Bottle
Dry Ice

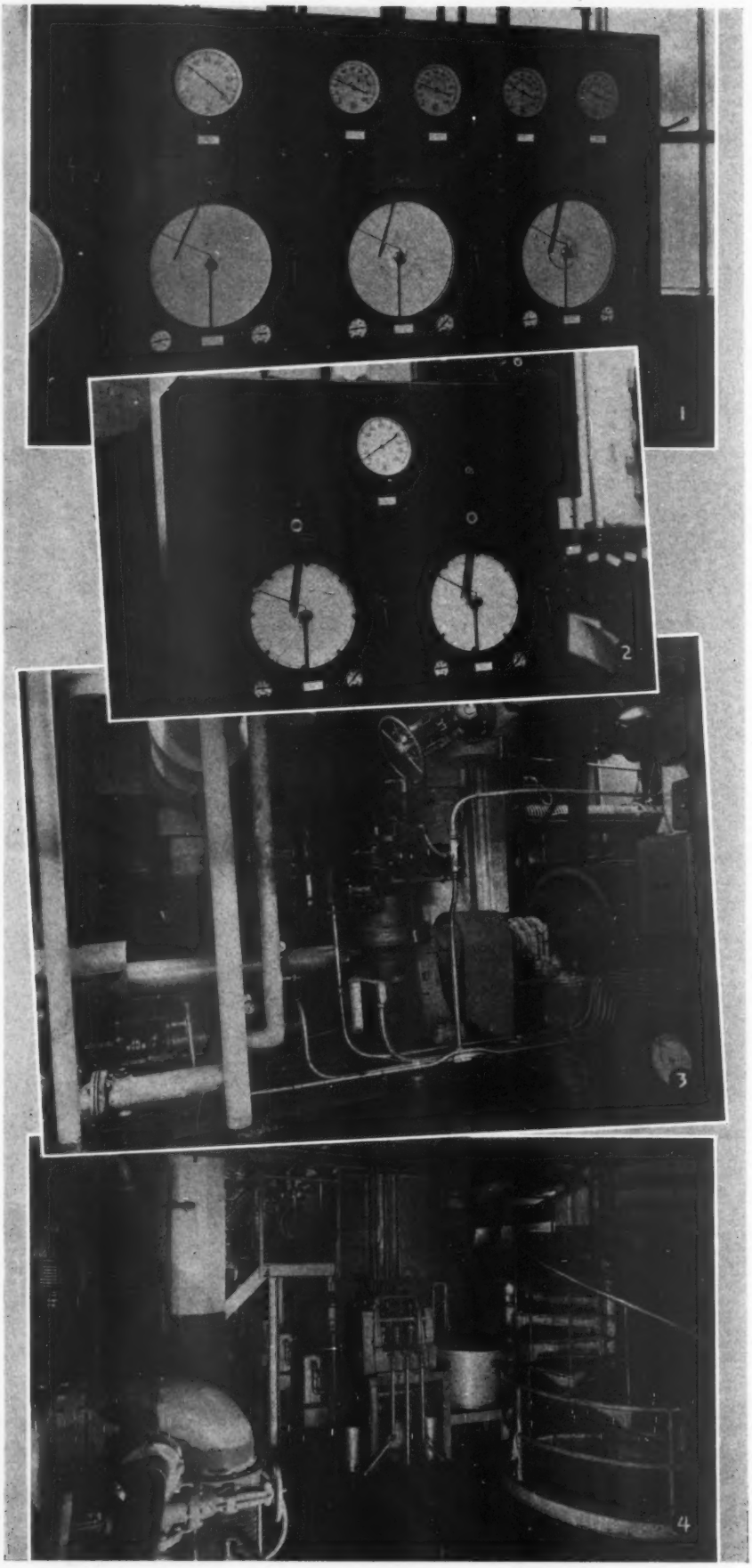


No. 1, The Five No. 5 Shartle Miami Jordans preparing stock for No. 5 machine.

No. 2, Shartle Agi-Flo Pumps on stock chests in basement under No. 5 machine.

No. 3, Bingham 24-inch centrifugal white water circulating pump. Metal pipe brings white water flow from fourdrinier pit together with stock flow introduced into this pipe, and discharges to Bird screen flow boxes. Rubber lined fittings. Capacity is 12,500 G.P.M.

No. 4, Worthington white water pumps. Larger pump handles couch pit stock to Oliver saveall and to breaker beater. Smaller pump handles white water from fourdrinier suction box seal pit discharging to fourdrinier pit.



Wet Wash Laundry
Coffee
Coffee Shipping Container
License Plate
Chocolate
Can End
Shoe
Ice Cream Bar
Ice Cream Carton
Briquette
Potato
Apple Chop
Bean
Insecticide
Garbage Pail Liner
Insulation
Chemical
Egg Crate Liner
Poultry Box Liner
Date
Beef
Celery
Bathing Suit
Butter Cube

Shipping Containers

Solid Fibre Shipping Containers
Test Corrugated Shipping Containers, A Flute and B Flute
Non Test Corrugated Shipping Containers, A Flute and B Flute
Interior Packing

Folding Boxes

Clothing
Laundry
Cake
Pie
Millinery
Blanket
Envelope
Sausage
Display
Lumber End Caps
Shells
Ice Cream Packing Trays
Folding Box Specialties

No. 1, Three Taylor Fulscope recording differential pressure controllers. Controller at the left side of panel maintains a constant differential between the two steam headers at the paper machine and the main steam supply header. It also selects steam as required from a 175-lb. steam line and a 40-lb. steam line and in addition releases excess steam back into the 40-lb. line when required.

The other two controllers maintain a constant differential in the Fulton dryer drainage system.

No. 2, Two Taylor Fulscope unit system double duty recording pressure controllers, operating steam supply valves and atmospheric relief valves on the two drying sections of the machine.

No. 3, General Electric 670-h.p. variable speed paper machine drive type steam turbine equipped with sensitive electric type governing mechanism, and connected through reduction gear to basement line shaft.

No. 4, Battery of six stainless steel color tanks made by Alaskan Copper Works, and three cylinder metering color pump for No. 5 machine coloring.

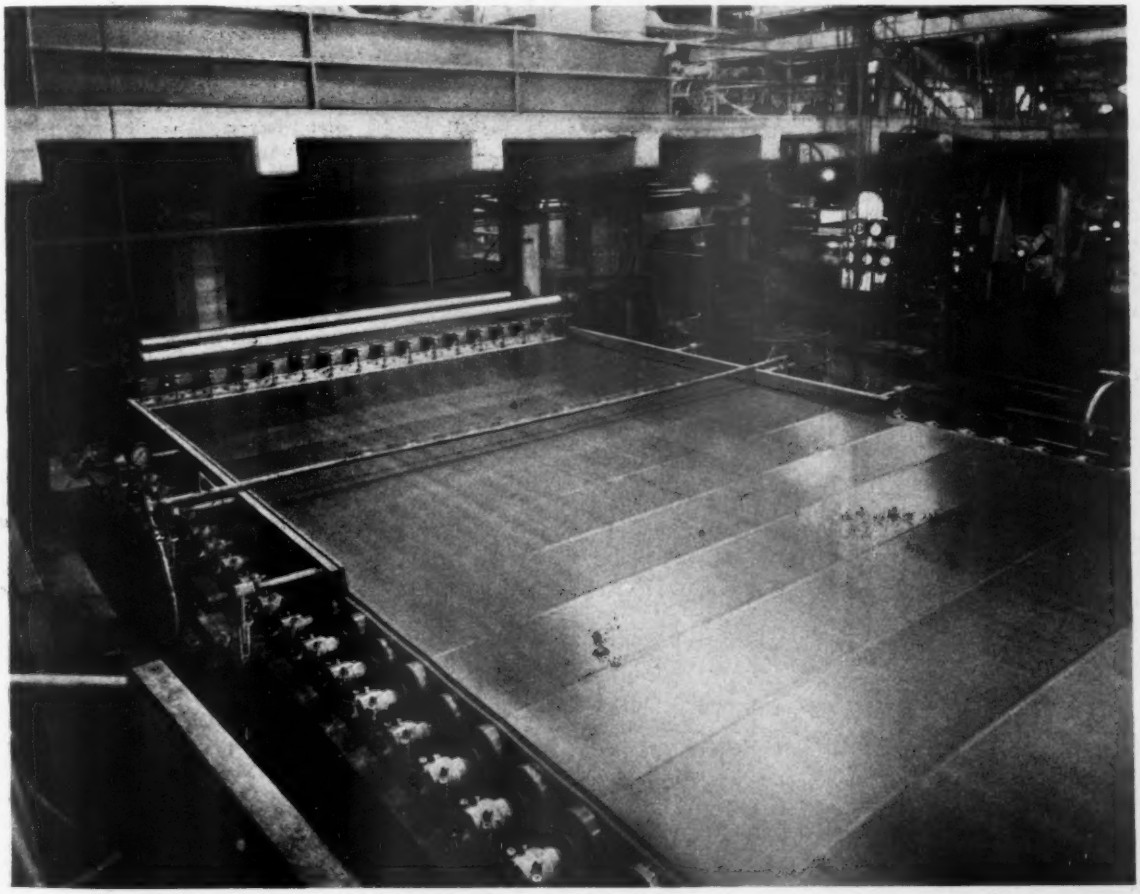
Longview Fibre's New Paper and Board Machine

THE latest important event in progress of the Longview Fibre Company of Longview, Washington, occurred early last December when the new No. 5 paper and board machine went into operation.

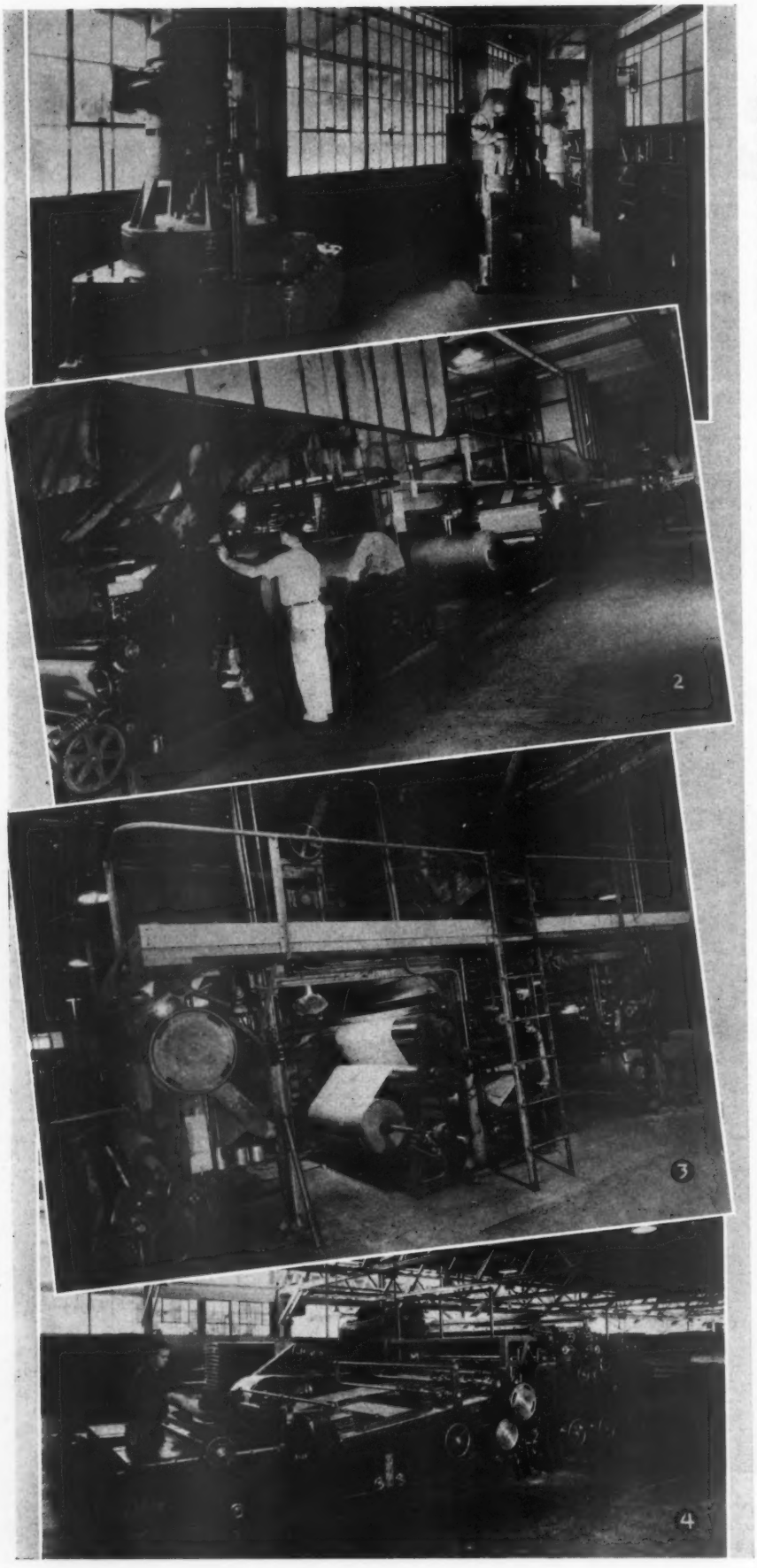
Built by the Beloit Iron Works of Beloit, Wisconsin, No. 5 was designed primarily for operation at maximum speeds consistent with the development of best sheet characteristics, on various types of kraft papers with the added requirement of producing a moderate tonnage of high test container board and similar heavy sheets. The fourdrinier is of 200 inch wire width and provision has been made for operating speeds up to 1500 feet per minute.

The New Flow Evener

● Perhaps the most interesting feature of the fourdrinier part is the new Beloit Flow Evener (See photographs and sketches). Through the use of this device, the conventional open head box is eliminated entirely and the machine screens are no longer positioned in line with the paper machine, but are located on a mezzanine floor alongside. The Flow Evener may be said to consist of a distributor and an enclosed slice. The distributor employs the principal of counter flow for the stock and water mixture in two parallel tubes located parallel to and slightly below the breast roll and served by a balanced hydraulic circuit from the remotely located screen flow box. One of these tubes receives its flow at the back of the machine and carries across toward the front, while the other tube is fed at the front and flows towards the back. Each tube is equipped with a re-circulation fitting that introduces a portion of its flow from the end opposite the inlet to the inlet end of the companion tube, thus keeping the entire volume of stock and water mixture in active circulation. Special orifice plates are carried along the top of each tube and these discharge through streamlined passages that combine and lead directly to the slice proper. The bottom slice lip, so positioned as to just clear the wire passing over the top of the breast roll extends slightly beyond the breast roll centerline. The top lip is an extension of the top or cover, under which the flow from the distributor is brought forward, and provision is made for raising or lowering the slice lip end of this assembly by



Beloit Fourdrinier from back side looking toward Flow Evener ' ' ' Alternate table rolls shown dropped for formation control ' ' ' No-deckle device replaces deckle straps ' ' ' Note reflection of slice adjustments on stock flowing on wire in this unretouched photograph.



means of a single hand wheel located at the operator's position. In addition to this control of the slice lip, a special, streamlined valve is located in the connecting piping between the screen flow box and the distributor, this being the means by which the pressure in the slice and therefore the spouting velocity of the flow to the wire is set to the requirements of machine speed and sheet formation. Quick opening access doors are provided at the end of the distributor tubes and at the ends of the upper part of the flow evener, so that all parts can be readily reached during a wash-up.

The Fourdrinier

● A wide forming board is carried under the fourdrinier wire next to the breast roll, having its wire contacting surfaces so arranged as to facilitate prompt removal of white water that drains through the wire in this stage of the formation. The first section of table rolls after the forming board have stainless steel deflectors positioned to catch the water thrown from each roll, preventing the trapping of part of the water removed between the wire and the succeeding roll. All table rolls are of seamless aluminum tube construction, Micarta covered, and with their bearings carried in rubber mountings so arranged that individual rolls can readily be dropped out of contact with the wire or brought back into their original setting. Deckle straps have been eliminated by the use of a no-deckle device.

The high speed, double unit shake is driven by an adjustable speed direct current motor, provision being made for varying the speed of the shake or its amplitude to suit formation conditions. Maximum shake can be carried at the breast roll end of the forming space with gradual reduction to the suction box end, or the shake arrangement can be re-set to give maximum shake at the center of the forming area with a reduced shake at the breast roll, etc., all without loss of time or production.

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No. 1, Two Pacific-Western Vertical Agitator Drives over broke stock chests for No. 5 machine.

No. 2, One of the Longview Fibre Company's two large machines for producing corrugated board.

No. 3, Asphalt coating machine for producing duplex asphalt papers.

No. 4, Swift solid fiber box making machine which prints in two colors, slots and scores the blanks.

The seven fourdrinier suction boxes are of stainless steel construction and have Micarta covers. They are carried in oscillating mountings, and are made for readily washing out the entire inside surface of box and cover through access openings at each end.

The fourdrinier is of the adjustable pitch type with air operated removing equipment to facilitate wire changes in the shortest possible time. It is equipped with an automatic wire tensioning device. All parts are of corrosion resistant metals or covered with stainless steel, as for example, the main fourdrinier beams.

The suction couch roll is 36-inches in diameter, arranged for contilevering during wire changes, and equipped with an 18-inch diameter lump breaker roll.

The Press Section

● The press section consists of a Beloit dual press, which will be noted in the photograph, is a four roll unit, mounting two 32-inch diameter, rubber covered suction press rolls. The first suction roll is fitted with the double vacuum box arrangement and acts with a primary press roll as well as with the 42-inch diameter, 208-inch face Stonite covered center roll of the dual press. With this arrangement, the sheet passes through three water-removing nips without being subjected to an open draw. The two press felts are carried on rubber covered felt rolls, each felt being provided with automatic and hand guide arrangement as well as motor driven basement felt stretcher. The press loadings for both first and second presses are indicated separately for the front and the back of the machine on sensitive type gauges from pressure elements, so mounted as to practically nullify the inaccuracies that are ordinarily encountered due to frictional drag of the mechanical interconnecting parts.

The Stonite roll of the dual press was covered by the Huntington Rubber Mills of Seattle and weighs 14 tons. The core was made by Beloit and shipped to Seattle for covering. Huntington also rubber covered the two marking press rolls and the lump breaker roll.

Griffith Rubber Mills of Portland covered the press section felt rolls and a plain press roll.

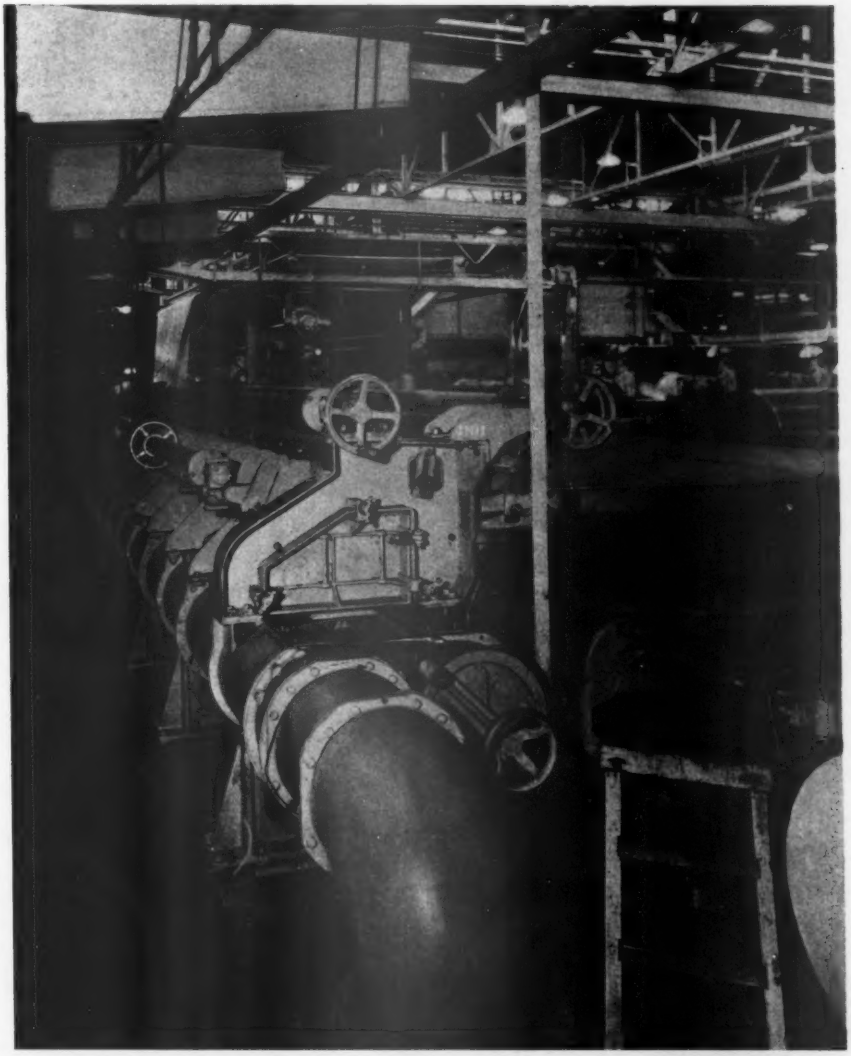
● The press felts are kept clean with Vickery felt conditioners as a safeguard against the heavy expense and lost production that would result from midweek shutdowns for washing up clogged, dirty felts. As on Longview Fibre's other machines, the Vickery felt conditioners keep the felts on No. 5 continuously clean and open through the week, assuring better and more uniform paper finish and maximum water removal at the presses.

The Dryer Section

● The dryer section of this machine consists of a total of thirty-nine dryers, 60-inches in diameter, and divided into two independent sections. Eight of these dryers are used as felt dryers in the first section, there being three Feeney type felt dryers on each of the first section felts for the removal of moisture from the felt during its run between adjacent paper dryers, and one felt dryer on the return run of each of these felts. The two felts of the second dryer section are each equipped with one dryer of the Feeney type. Both paper dryers and felt dryers are equipped with Beloit high speed condensate removers which function to effect the removal of water from the dryers without permitting the accumulation of a pool of condensate in the dryers at any time. The steam fits are of the fully balanced, carbon disc type, so designed that variations in steam pressure have no appreciable effect on the operating power requirements.

Fulton System

● The new No. 5 paper and board machine, like Longview Fibre's other four machines, is equipped with a



View from back of No. 5 at the Beloit Flow Evener showing main slice adjusting control at upper right and lip positioning adjustment at left ↑ ↑ ↑ Note access doors at end of Flow Evener tube ↑ ↑ ↑ There are corresponding openings at other end ↑ ↑ ↑ Access door at combining chamber.

Fulton Dryer Drainage System for maximum steam economy. This was supplied by the Midwest-Fulton Machine Company of Dayton, Ohio.

Visi-Flow fittings in the condensate piping of the Fulton system, permit the operators to see the degree of condensate removal.

All dryers are carried on heavy duty SKF bearings with provision in the mounting of the front bearing for expansion. Particular attention was paid to the design of both front and back dryer frames to secure maximum accessibility and safety for the operators when cleaning dryer doctors or removing broke from the dryer section while in operation. The back dryer frame forms an oiltight enclosure for the paper dryer drive. The felt dryers are driven by the contacting felt.

An circulating oiling system keeps all the SKF dryer bearings, all drive bearings and drive parts fully supplied with oil. Individual reservoirs at each bearing provide against trouble should the oil circulation stop inadvertently. In the basement under No. 5 machine the oil from the dryer bearings is cleaned by a centrifuge, cooled and pumped back through the bearings.

The Marking Press

● At the division between the two dryer sections, a special marking press installation has been made consisting of three rolls on the same horizontal center line. The center roll is of chilled iron, and the two outside rolls have rubber covers, the outside rolls being brought into contact with the center roll by means of special, air-operated pressure devices with sensitive indicators to show the prevailing nip pressure. The rubber covered rolls can be removed or installed while the machine is in operation, and with the rolls available it is possible to carry out several different types of operation. For example, marking rolls of two different designs may be carried in the press so that the type of mark placed on the paper can be quickly

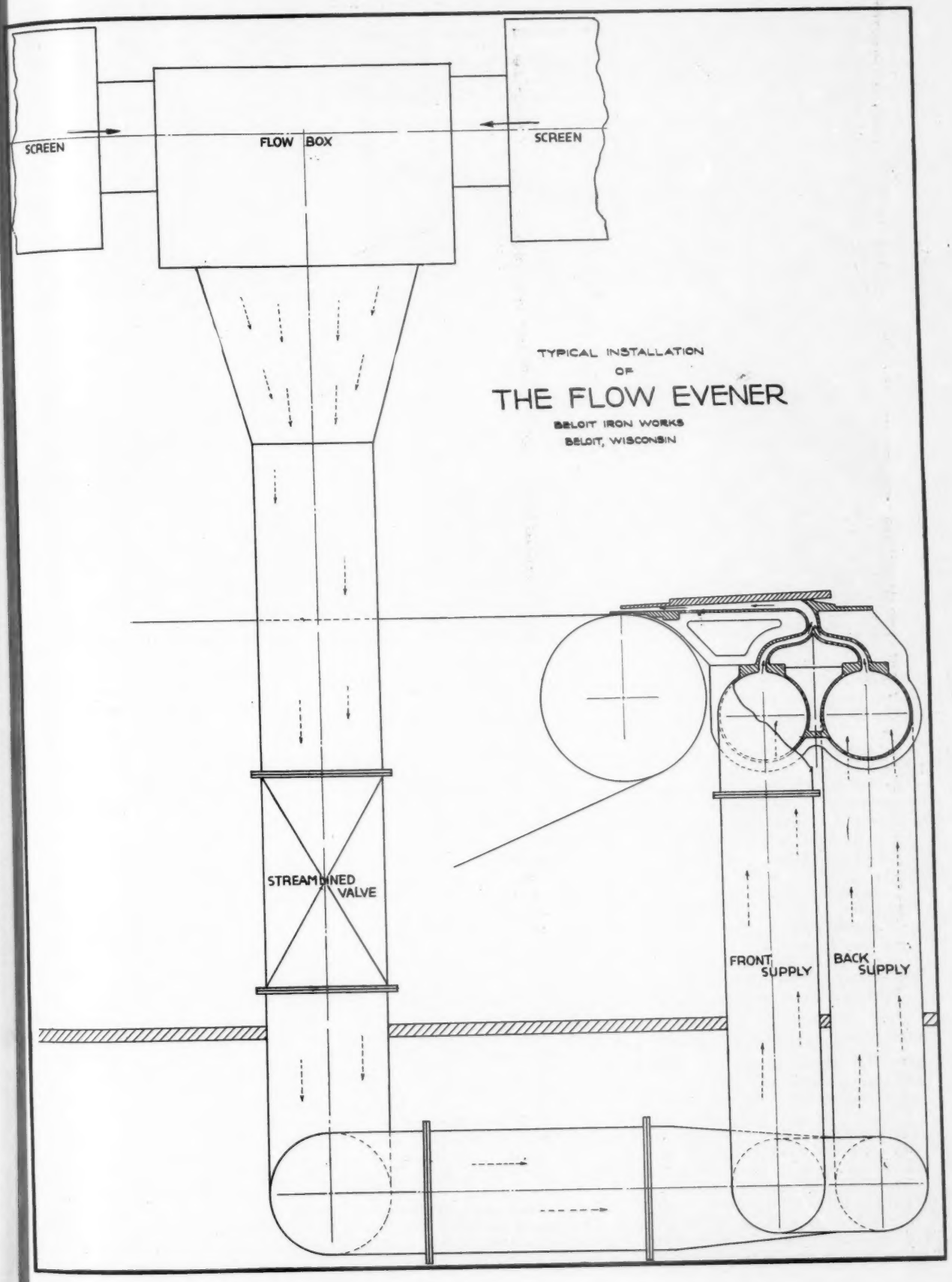
●

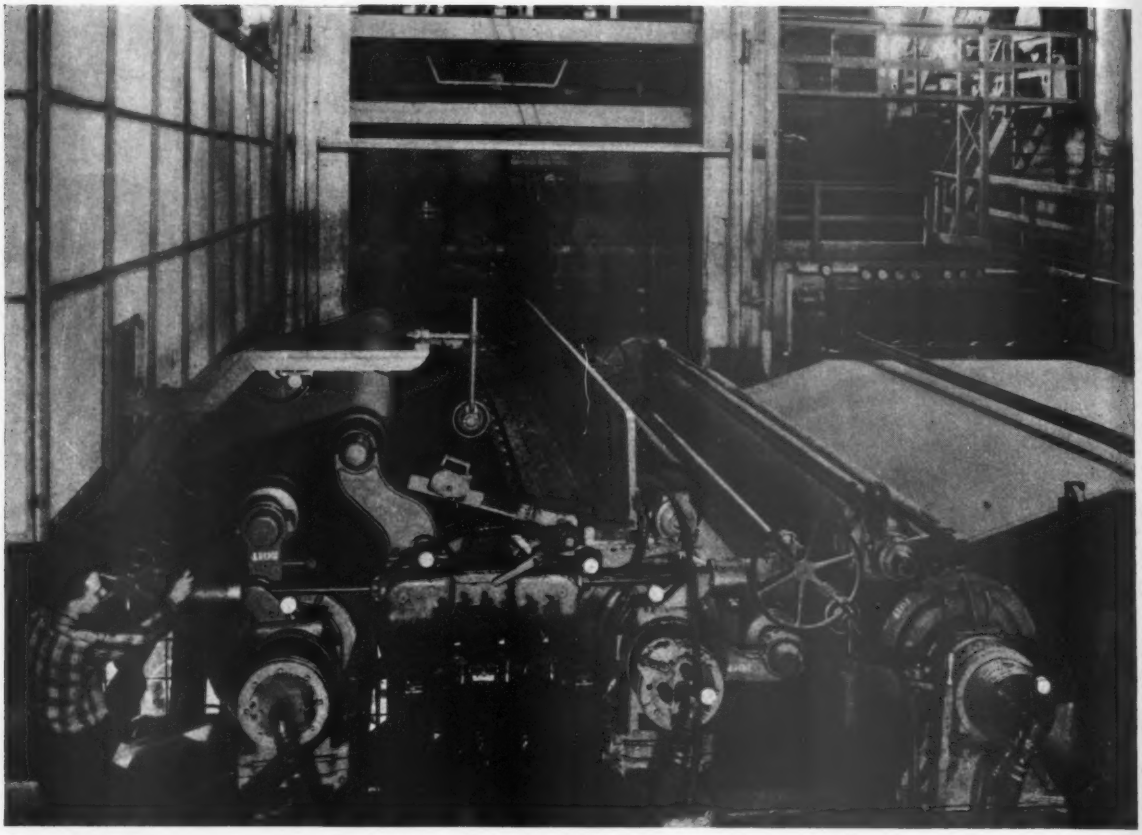
No. 1, Longview Fibre's unusual arrangement for rapid folding of the solid fibre blanks coming from the Swift printer, slotter and scorer.

No. 2, A line of stitchers at work stitching boxes.

No. 3, A view of part of the Longview Fibre Company's extensive modern paper bag making plant.

No. 4, Ready for shipment are these rolls of kraft wrapping paper in one of the warehouses.


SCREEN
FLOW BOX
SCREEN
TYPICAL INSTALLATION
OF
THE FLOW EVENER
BELOIT IRON WORKS
BELOIT, WISCONSIN
STREAMLINED
VALVE
FRONT
SUPPLY
BACK
SUPPLY



Press Section including on the right the suction couch ' ' ' Dual Press in the center ' ' ' Note the Dual Press is a four roll unit including two rubber covered suction rolls, a center Stonite roll and a primary top press roll running over first suction press roll ' ' ' In the upper right corner on the balcony are the Bird Screens ' ' ' In the upper center background is the Oliver Saveall.

changed without loss of production. Alternately, a smoothing roll may be mounted in one position with a marking roll in the other, thus obtaining both high finish and the desired marking at the same time.

Two independent rope carrier systems are used, the first receiving the leading edge of the sheet at a point adjacent to the center roll of the dual press, and conveying it through the first dryer section. The second system takes the sheet from this point through the marking press and the second dryer section to the calender stack.

The Machine Hood

● The hood over the dryer section of this machine was designed and installed by Drew and Hoffman of Portland, Oregon. It is a panel type hood, the panels being prefabricated and consisting of structural steel frames with flat asbestos board affixed to the under side. The dryer sections before and after the marking press are each equipped with their own separate and complete hoods with controllable and positive exhaust. The hood proper including the top panels and drop panels are supported directly on a structural steel frame which in turn is carried on the paper machine frame. In the top of each hood there are removable panels located over the front and rear machine frame along its entire length. These are removed by merely lifting out by hand when it is desired to use the machine room crane for handling dryer rolls, bearings, gears, etc.

The exhaust from each hood is conveyed through panel type stacks through the building roof. There are two stacks from each hood, and each is provided with a telescope section to permit passage of the machine room crane. The two telescope sections from each hood are connected together through a system of cables and pulleys to a single winch. Counterweighting makes raising and lowering the telescope sections an easy task.

Positive and controllable exhaust is provided by axial flow type fans driven through flexible couplings by splash proof motors. Unusual accessibility to the fans and motors results from their being located above the building roof. On the outlet side of the fans a panel type asbestos board and steel stack discharges the vapors vertically to the atmosphere. That portion of the stack located above the building roof is insulated and weatherproofed.

As agents for the patented systems of the J. O. Ross Engineering Corporation, Drew and Hoffman installed a Ross-Grewin high pressure vapor absorption system on the dryer section of this machine. This system increases the rate of drying and tends to prevent over-dried edges and wet centers. The air for this system is furnished by a centrifugal compressor which is V-belt driven. The use of centrifugal compressors has superseded the cycloidal type blower, because they give a smooth instead of a pulsating flow of air. The air is heated by copper fin type blast radiation with steam, and delivered to the machine through a piping system for discharge through special nozzles to the pockets of the machine.

The Calender Stacks

● To facilitate manufacture of a wide variety of paper, the No. 5 machine is equipped with two calender stacks of the Beloit "open sided" construction. Each stack contains eight rolls, the bottom roll being of 32-inch diameter. All of the rolls are mounted in heavy duty SKF bearings and provision is made for steam heating of the rolls in either stack, with the exception of the bottom rolls themselves. The intermediate and top rolls have their bearings positioned by swing arms that are pivoted from the heavy section calender stack columns, and their Rice Barton doctors are mounted directly on the bearing housings so that the contact between doctor and roll remains unchanged under all conditions. Doctors for the bottom calender rolls are oscillated. The roll lifts are motor operated.

The Reel

● The reel is of the uniform speed type especially adapted for heavy duty service, being capable of winding rolls up to 72-inches in diameter. In both the starting and finishing positions, the reel spool is held against the drum by means of air cylinders, this to permit building up reels of any desired hardness from start to finish. With this arrangement for example, it is possible to start the sheet on an empty reel spool and wind the first layers under comparatively high pressure, then gradually decrease the pressure to obtain a less dense condition in the outer part of the finished reel.

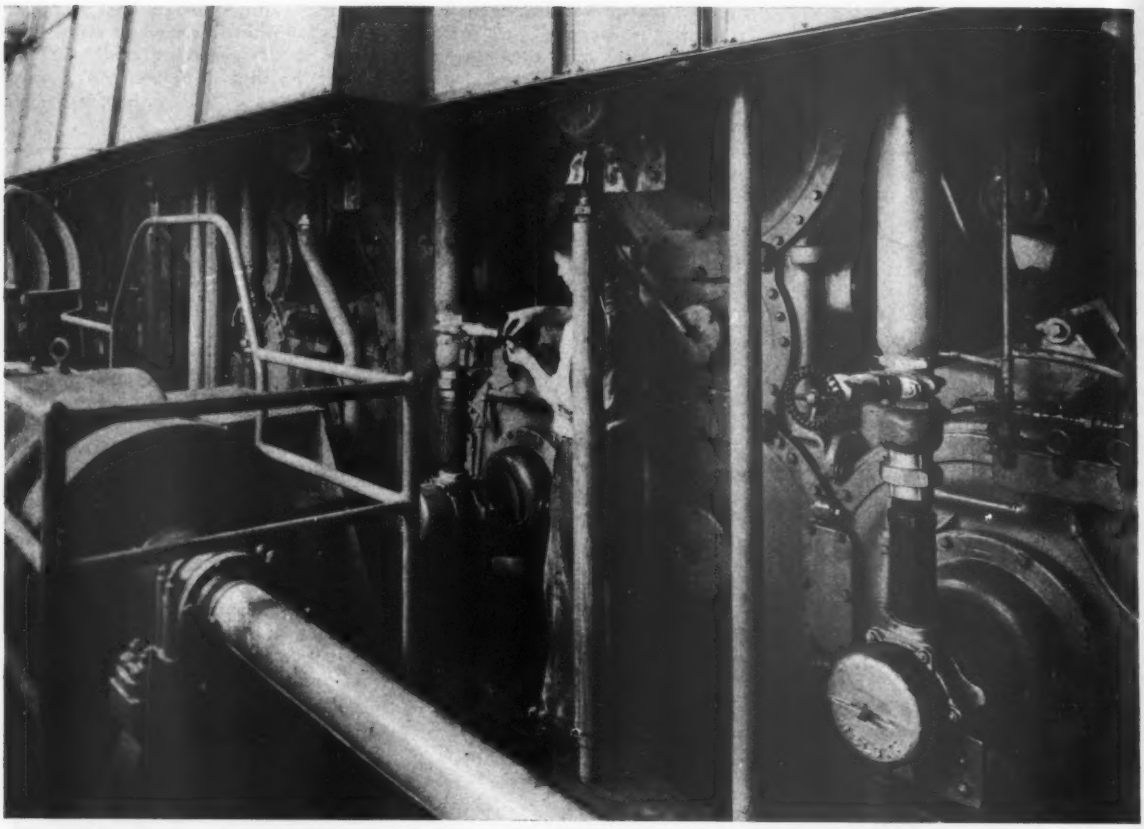
The Winder

● The double drum winder is of the heavy duty, high speed type, driven by a single direct current motor located in the basement with provision for adjusting the relative speeds of the two drums. The rider roll is controlled by air, to permit varying the contact pressure between the roll and the winding rolls of paper. Its drive is from a separate direct current motor with provision for adjustment of power input. A power operated roll ejector is used to move the finished sets of paper rolls from the winder and start them over to the receiving table. Special shaft pulling equipment has been provided for use with the larger rolls.

The Drive

● The various sections of No. 5 machine are driven from a basement lineshaft through Beloit enclosed hypoid gear units, each of which is fitted with a multiple disc mechanical clutch and motor operated belt shifter. Due to the wide variety of products planned for this machine, special attention was given to the necessity for a wide range draw control at the couch and press section. The basement lineshaft, mounted in anti-friction bearings, is driven by a 670 h.p. General Electric paper machine drive type steam turbine equipped with an especially sensitive electric type of governing mechanism, which permits a speed range of 12 to 1 and maintains over this entire speed range the exacting regulation requirements demanded by paper makers.

Dryer Section ✓ ✓ ✓ Here is the start of the first dryer section ✓ ✓ ✓ Front bearings of upper felt dryers may be seen at upper left ✓ ✓ ✓ Also showing are the SKF rocker mounted front dryer bearing assemblies, the Ross-Grewin System piping, circulating oiling system on dryer bearings with individual reservoirs at each bearing, and box type dryer frames.



Dryer Section back side showing enclosed dryer drives housed in back dryer framing ' ' ' These housings are oiltight ' ' ' Continuous oiling system lubricates all drive and bearing parts ' ' ' Beloit hypoid drive gear units.

The turbine drives through a General Electric reduction gear with double extended shaft, making possible the installation of the unit in the center of the line shaft thereby approximately dividing equally the load output in either direction.

Remote control of the speed range is provided in the form of push-button operated magnetic control.

A brief descritpion of the turbine speed governing mechanism is of interest for it shows the care exercised by the Longview Fibre Company making the new No. 5 machine a highly efficient producer of uniformly high grade papers and boards.

● The new speed control consists essentially of a standard fly-ball-type governor positively coupled with the turbine by means of a synchronous electric transmission. The fly-ball mechanism is mounted directly on the shaft of a vertical synchronous motor. This motor has two windings on the stator, the second having twice the number of poles of the first. These windings are connected through a pole-changing switch to a synchronous generator mechanically coupled to the turbine. This type of transmission was developed because it is positive in action and is not affected by those causes regularly associated with speed fluctuations. In addition, the electric nature of the control makes it possible to provide a simple, easily operated remote-control station for varying the speed of the turbine.

A three-unit set consisting of motor, exciter, and oil pump constitutes the auxiliaries for the governor. These provide excitation for the synchronous generator and oil under pressure for lubrication of the bearings and gear mesh and for operation of the oil-relayed governing mechanism.

Adjustment over the entire speed range of the turbine is effected by a raise-lower push-button remote-control station at a location near the paper machine. When the limit of the control range possible with the first pole combination of the motor driving the governor is reached, a limit switch automatically operates the pole-changing switch. This operation transfers the motor to the second pole combination and simultaneously repositions the governing mechanism to traverse the added speed range of the turbine without appreciable variation from a smooth curve of speed adjustment.

The use of two different pole combinations in the synchronous generator as well as in the synchronous motor allows an extension of the practicable speed range without loss of governing accuracy. The proper combinations of the multipolar windings on both generator and motor make it possible to govern speed accurately at any point within approximately a 12 to 1 speed range. This increased range permits many different weights of paper to be more readily produced on the machine.

The development of the new governor is due in large part to the past broad experience of the designing engineers in meeting the requirements of the paper industry. It is generally accepted that the most accurate speed governors built are those using the principle of a fly-ball governor. Governors of this type have been made sensitive and accurate for a relatively short speed range up to approximately 3 to 1. It must be remembered, however, that in this type of governor, the forces vary as the square of the speed, thus giving at 1/3 speed only 1/9 the full-speed power necessary for governing. It is therefore evident that a governor of this type cannot be built to give sensitive control much in excess of this relatively short speed range. From these considerations it can be seen that the desirable long-range governor would then be a governing device making use of a fly-ball type governor within its sensitive region and increasing the range of the mechanism by some equally accurate means.

As previously explained, the new electric governor has been developed along these lines. The fly-ball mechanism which controls the steam inlet valves is always driven within its sensitive range by the multipolar synchronous motor. This is made possible by a simple mechanism which changes the lever system when a speed change is called for by the oper-

ator at the push-button station. Since the driving mechanism motor is coupled to the turbine by gears and an electric tie, the difficulties of certain types of fluid governors are not encountered. Temperature variations can have no effect on the speed control because the governor takes full advantage of relaying. As in the short-range, simple fly-ball governor, the new speed control uses a fluid-restoring mechanism to correct for the fundamental regulation of the fly-ball system. The device accomplishes the correction by repositioning the governing mechanism after a load change has demanded that the governor cause a movement of the steam inlet valves. By this means, constant speed is maintained regardless of changes in initial steam pressure, superheat, back pressure, or load.

Speed changes with the new governor are obtained by the use of a single manual push-button station as previously described. When the raise button is pushed, the speed-changing motor is energized and changes the fly-ball mechanism, increasing the turbine speed, until the fly balls have reached three times their minimum speed. At this point, electric contact is automatically made, changing the motor connection with the generator to the second pole combination, and changing the lever system until the fly-ball mechanism is in a psition to operate at a speed slightly higher than its minimum speed on the first pole combination.

However, since the motor is now operating at one half its former speed because of the pole change, the governor is also operating at one half the speed it was before the electric contact was made. With the speed-changing motor still operating, the governor carries the turbine speed to approximately twice its original speed, at which point the governor speed is maximum. A slight overlap of speeds at the pole-change interval is used, so there is no tendency for the governor to hunt at this point should it be desired to hold the speed of the unit in this region. The operation of lowering the speed is practically the reverse of the above with slight modifications to insure speed stability at all points within the range.

The turbine received steam from the 185 pound pressure mill supply line and exhausts to the dryer section at a variable pressure depending upon drying conditions prevailing. Taylor automatic steam control equipment functions to add make-up steam from the 40 pound pressure service line in the mill unless the dryer steam requirements call for higher than the 40 pound pressure. Under such conditions the make-up is from the high pressure line through a regulating valve. A feature of this control is that the machine operators need not have any concern as to the steam supply, as all pressure regulating valves function automatically, being controlled primarily by the conventional control at the backtender's position.

The steam control of No. 5 machine is described in detail in another article in this issue.

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STEAM CONTROL
On Longview Fibre's No. 5 Paper Machine

by VIRGIL M. SUTHERLING*

THE problem of controlling the steam supply to the new No. 5 paper machine dryers appeared quite complex upon first investigation, due to the varied nature of operating conditions.

It was to be a two-section machine, with steam turbine drive, either section being capable of operating independently of the other section at any steam pressure from 0 to 65 pounds per square inch. The driving steam turbine, which exhausts into the dryer headers, should not operate at a higher exhaust pressure than required in the dryers, thereby keeping the turbine water rate as low as possible. The steam consumption of the turbine is, of course, governed by the amount of power required to drive the machine. By making a resume of grades of paper and speeds to be run, and by using the Beloit Iron Works estimated power consumptions at these operating conditions, and by employing the turbine performance curves, it was possible to calculate whether the dryers would consume more or less steam than the turbine exhausted.

To meet these excesses and deficiencies most economically, the steam control was to be designed so that it would automatically, in case of excess steam, exhaust into the main mill 40 lb. per square inch extraction line. It was previously stated that the turbine exhaust should not be higher than the dryer pressures. However, when the highest dryer pressure was below 40 lbs. per square inch, for example, 10 lbs. per square inch, it was found more economical to build the back pressure up to 40 pounds and exhaust into the mill extraction line rather than to exhaust to the atmosphere. The wastage of steam to atmosphere more than offsets any gain due to lower water rate because of decreased back pressure.

When the turbine was exhausting less steam than was necessary to maintain the desired dryer pressure, the control should first automatically make-up with 40 lb. steam from the main mill extraction line. This was to take advantage of the lower water rate of the larger main mill turbines. In those cases where insufficient steam could be obtained from the 40-pound mill line or when the dryer pressure exceeded 40 lbs. per square inch, the control should make-up from the high pressure mill steam line.

In addition, it was desired to incorporate in the controls a feature making it possible for the back tenders at the time of a sheet break to relieve the dryer pressure to atmosphere to facilitate bringing over the sheet. This was necessary because although the steam to the dryers is shut off, the dryer pressure drops very slowly when the only condensation in the dryers is caused by radiation.

Only Two Adjustments

● The final requisite was that the whole steam control system should be automatic except for the two adjusting knobs whereby the back tender could set the desired pressure on the wet and dry end sections.

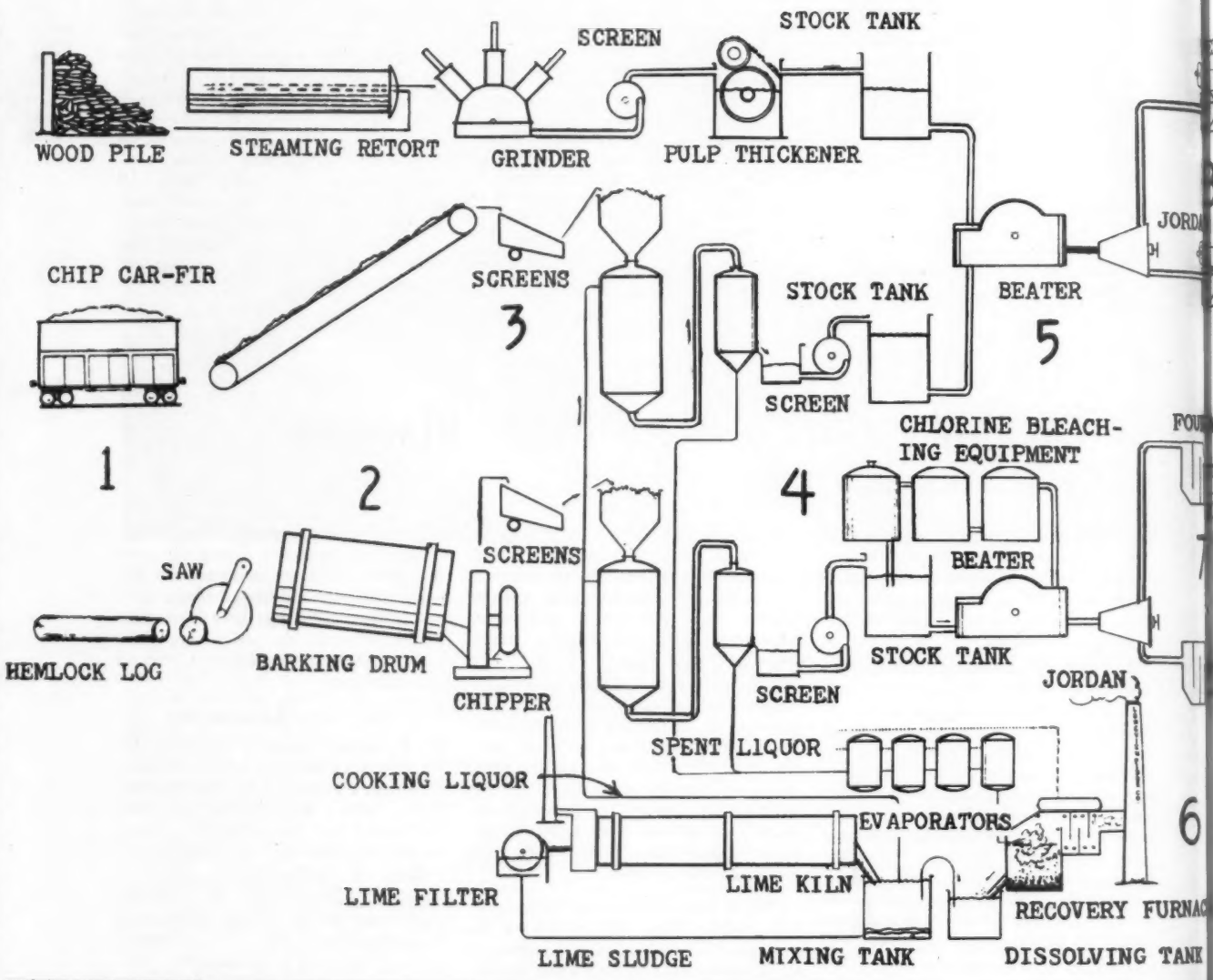
After a preliminary layout was made here at the plant the problem was submitted to various instrument manufacturers. The Taylor Instrument Company's pneumatic Fulscope pressure control system was decided upon as being the most suitable for this installation, and it has proved to be completely satisfactory. Before explaining how the control system was worked out, we wish to acknowledge the cooperation of Mr. L. H. Wear (Taylor Instrument Companies' Portland representative) in designing this control system.

The Steam Control Layout

● Referring to the diagrammatic piping drawing of No. 5 Machine, it is seen that it has a turbine drive and consists of 22 dryers ahead of

*Chief Instrument Engineer, Longview Fibre Company, Longview, Washington.

LONGV



THE above flow sheet of the Longview Fibre Company's operations at Longview, Washington, was prepared by the engineering department in the summer of 1940 before the installation of No. 5 paper and board machine.

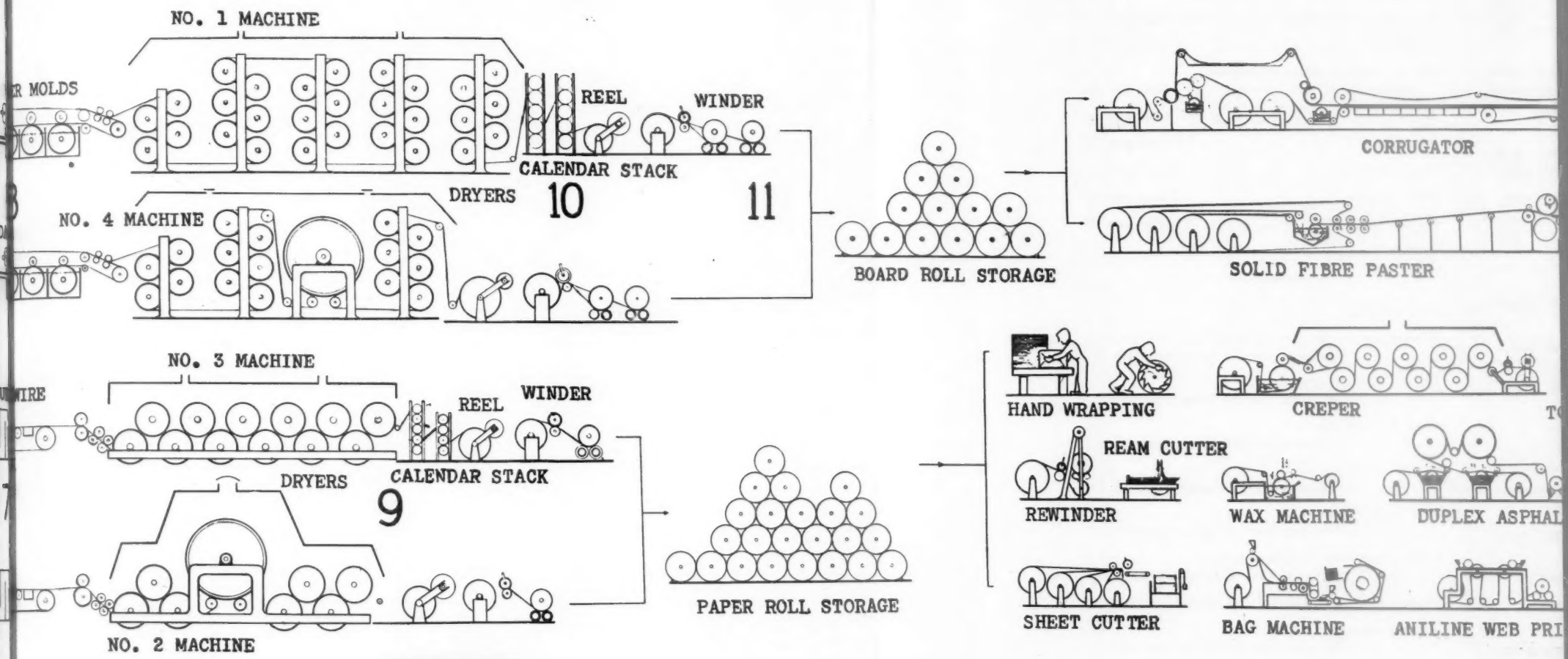
In its original form the flow sheet is 10 feet in length and to it are attached samples of wood, chemicals and finished products. It has been framed and at the present time is being routed among the distributing offices of Blake, Moffitt & Towne throughout the west for the education of salesmen and customers. The above drawing has been made from a photograph of the large flow sheet.

No. 1. Waste Douglas Fir wood is picked from conveyors at Long-Bell Lumber Co. mill by Longview Fibre Company employees, chipped at the sawmill, and brought over to the paper mill in Longview Fibre cars.

No. 2. The barking drum is a cylinder, about 13′x40′, made up of steel bars. The drum rotates and the tumbling of the four-foot pieces of wood removes the bark. The chipper is a rotating disc equipped with sharp knives which chip the wood.

No. 3. The chips are dropped into the digester from the chip bin. Here the cooking liquor is

W FIBRE COMPANY



Longfibre KRAFT

HERE, greatly simplified, is a picture of a successful industry built upon refuse wood. Douglas fir sawmill waste is manufactured into groundwood and kraft papers and boards and converted into a broad variety of useful products, wrapping papers, bags, towels and boxes.

added. Steam is used to raise the charge to 340° F., and the wood is cooked, the cycle taking about four hours. After cooking, the chips are discharged into a wash tank or diffuser where the spent liquor is washed out and sent to the recovery.

No. 4. In the bleach plant the brown kraft is treated with chlorine and lime to produce the various required shades of bleached pulp.

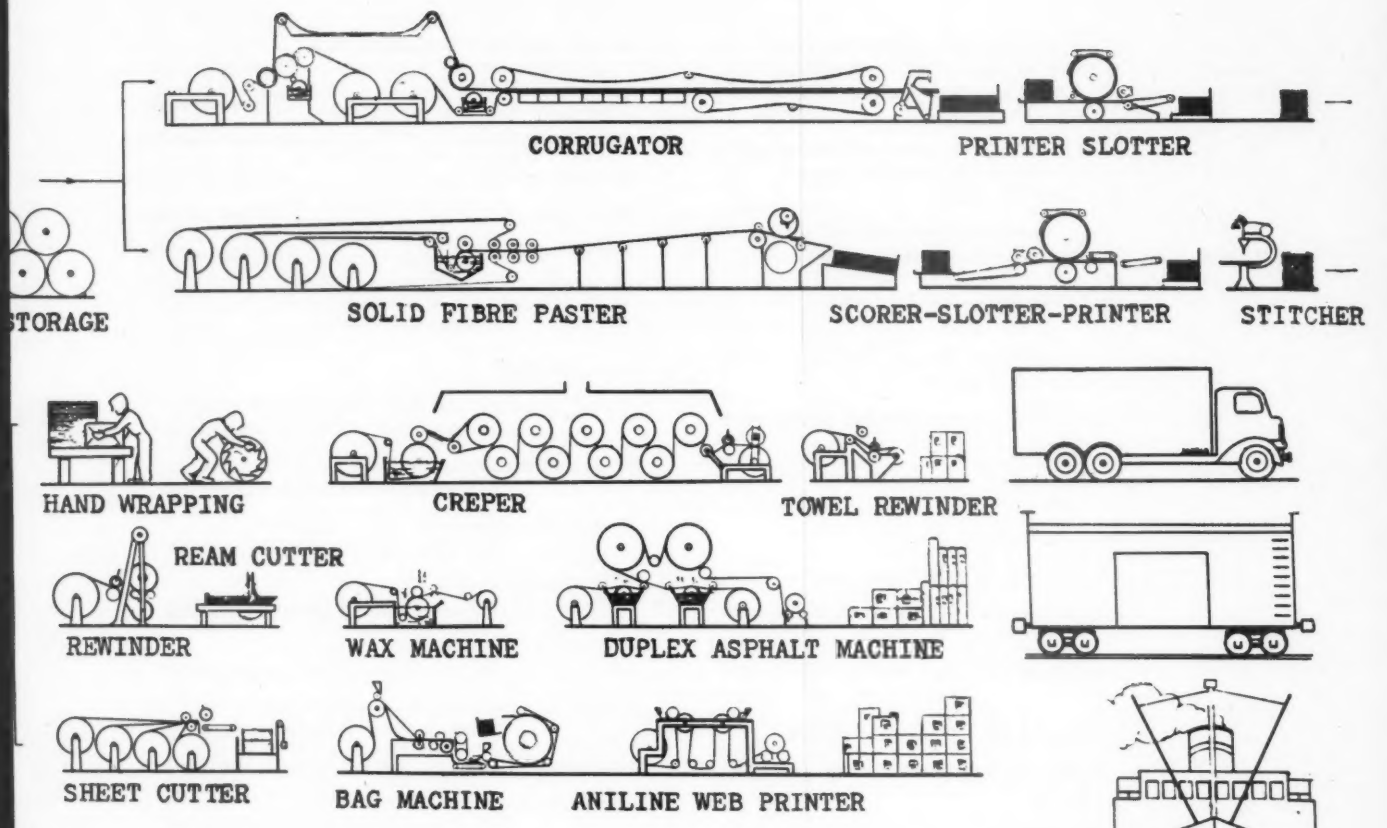
No. 5. In the beater various pulps are blended and alum and size are added. The action of the beater is to cause the fibers to chemically combine with water providing the mucilaginous qualities required to give strong paper.

The jordan consists of a metal cone, inset with steel knives, revolving inside a hollow cone also equipped with knives. Its effect is to shorten and further prepare the fibers.

No. 6. In the liquor recovery the spent liquor coming from the wash tanks is evaporated in steam evaporators, and then sprayed into a furnace. The combustible constituents, the pitch and resin in the wood, are burned, furnishing heat, which in turn generates steam used in the plant. The non-combustible portion which is sodium carbonate (Na_2CO_3) melts and runs out of the bottom of the furnace. Loss of chemical in the process is replaced by the addition of salt cake (Na_2SO_4). This is chemically changed to sodium sulphide (Na_2S) in the furnace, where it joins the carbonate running into a tank of water where on dissolving it becomes "green liquor."

Lime (CaO) is mixed with the green liquor and the sodium carbonate is converted to sodium hydroxide at the same time. The lime is converted to calcium carbonate ($CaCO_3$), but the sodium sulphide remains unchanged. The hydroxide and

M P A N Y



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Lime (CaO) is mixed with the green liquor and the sodium carbonate is converted to sodium hydroxide at the same time. The lime is converted to calcium carbonate ($CaCO_3$), but the sodium sulphide remains unchanged. The hydroxide and sulphide in the proportions of about 80-20 are used in cooking.

The calcium carbonate is washed, filtered and introduced into a kiln where by the addition of heat it is converted to the oxide and reused.

No. 7. The pulp flows at a constant rate through a head box on to a fourdrinier which consists of an endless wire mesh. As the water drains through, it leaves a sheet of wet paper on the wire. The removal of water is aided by suction boxes. The paper is picked by a felt and carried through the

Continued on the next page

dryers, where the remaining moisture is taken out.

No. 8. The pulp is picked up by cylinder molds, which are covered with fine wire mesh, and taken from there by the felt. As there are a number of cylinders, the board consists of several layers. The board passes through press rolls where a large part of the water is taken out and from there goes to the dryers.

No. 9. Dryers consist of hollow cylinders filled with steam. The Yankee dryer, which is the large one, is highly polished and imparts a glaze to one side of the paper.

No. 10. A Calender stack consists of heavy solid steel rolls, through which the sheet is passed. This gives the sheet a smooth finish.

No. 11. On the rewinder the roll of paper is trimmed and slit to the desired sizes.

No. 12. RAW MATERIALS: Wood: 55 cords of fir wood per day for ground wood

180 cords of fir wood per day for kraft pulp (for board)

200 cords of hemlock wood per day for kraft pulp (for paper)

Chemicals:
21,000,000 gallons of water per day

1½ tons of rozin per day for sizing board and paper

2½ tons of alum per day for "setting" the rosin

2 tons of chlorine per day for bleaching

13 tons of salt cake per day for cooking liquor

Varying amounts of the following: soda ash, sulphuric acid, dyestuffs, starch, alcohol, printing inks, formaldehyde, ammonia, and zinc hydro-sulphide.

Energy: 12,000 kilowatts per hour
250,000 pounds of steam per hour.

No. 13. PRODUCTION:

Pulp: Ground wood pulp ..... 65 tons per day
Fir Kraft pulp ..... 95 tons per day
Hemlock Kraft pulp .....105 tons per day
*"Broke" ..... 35 tons per day
Total 300

*Broke is paper and board waste from manufacturing and converting operations that is reused

Machine Production:

No. 1 Board Machine.....140 tons per day
No. 2 "M G" Paper Machine 40 tons per day
No. 3 "M F" Paper Machine 40 tons per day
No. 4 Board Machine..... 80 tons per day
Total 300

Disposition of Machine Production:

Shipping Containers.....100 tons per day
Folding boxes ..... 2 tons per day
Board sold to other container manufacturers .....118 tons per day
Bags ..... 13 tons per day
Towels & Crepe ..... 10 tons per day
Asphalt paper ..... 5 tons per day
Wax paper ..... 3 tons per day
Paper sold ..... 47 tons per day
Total 300

No. 14. LABOR:

Wood preparation and pulp manufacture.....185 men for 24 hour operation
Paper manufacture ..... 90 men for 24 hour operation
Board manufacture ..... 60 men for 24 hour operation
Bag manufacture .....120 men for 8 hour operation**
Box manufacture .....160 men for 8 hour operation**
Crepe and towel manufacture..... 30 men for 8 hour operation
Shipping .. 20 men for 8 hour operation
Maintenance .....190 men for 24 hour operation
Supervisory ..... 40 men for 24 hour operation
Office .....110 men for 8 hour operation
Total 1005

The following is a list of the normal operating time of the various departments:

Wood preparation ..... 8 hours per day, 6 to 7 days per week
Paper manufacture .....24 hours per day, 6 to 7 days per week
Board manufacture .....24 hours per day, 6 to 7 days per week
Bag manufacture ..... 8 hours per day, 5 to 6 days per week
Box manufacture ..... 8 hours per day, 5 to 6 days per week
Crepe and towel .....16 hours per day, 5 to 6 days per week

**Includes both men and women.

and 17 dryers after the marking roll. Dryer drainage is by means of a Midwest Fulton Forced Vapor Circulating system. To simplify this drawing, hand valves are not shown. Actually, they have been provided so as to permit by-passing and regulation when some diaphragm valve or other part of the control system is being repaired. The controlling instruments are mounted on two instrument panels, the main control panel being located back of the machine where it is accessible but not liable to be tampered with. The back tenders' panel is located on the front side of the machine at the back tenders' station, opposite the winder drum.

Controllers Nos. 1 and 2 were supplied as part of the Midwest-Fulton drainage system. They are Taylor Fulscope Differential Pressure Controllers, with full adjustable sensitivity and a differential pressure range of 0 to 10 pounds per square inch. Their purpose in conjunction with valves 1-A and 2-A is to maintain the set differential (usually one or two pounds) between the main dryer header and the header supplying steam to the four paper dryers which use the flash steam from the rest of the section dryers. Valve 1-A is a 4-inch, and 2-A a 3-inch Taylor Motosteel diaphragm valve.

Controllers Nos. 3 and 4 are 0 to 75 pound range pressure controllers, and with valves 3-A and 4-A maintain the desired pressure in the wet and dry end sections. They also are built so that when the control points are lowered at the time of a sheet break, valves 3-B and 4-B will relieve the dryers to the atmosphere. The size of valves 3-A and 4-A was determined by the quantity of steam to be used for drying, which was based on grades of paper, machine speed and per cent moisture in and out of the dryer section. No. 3-A is a 10-inch and 4-A a 6-inch valve. Valve 3-B is a 4-inch and valve 4-B a 3-inch, their size being calculated so that they are capable of lowering the dryer pressures from 30 pounds to 15 pounds in a period of two minutes. When the control point is lowered at the time of a break, it is necessary that the steam supply valve be closed before the atmospheric relief valve starts to open; also that when an ordinary lowering of pressure setting is made of up to 5 pounds the relief valve will not open. To accomplish this a double unit system was built into each controller, one system being connected to each valve. Both systems have full adjustable sensitivity while the main steam valve system also has adjustable automatic reset rate. Both controllers are adjusted with a ten-pound pressure spread between the two systems. This means that by lowering the set pointer ten pounds, the relief valve will go wide open until the pressure starts dropping to its new control point. By adjusting the sensitivity on both systems in the controllers, it was possible to get the main valve closed before the relief valve started to open.

No. 5 Controller Heart of System

No. 5 controller is really the "heart" of the control system and required the most study before selection. It is a 0 to 10 pounds differential controller which maintains the turbine exhaust line pressure at a set amount (we are now operating at 4 pounds per square inch) above the highest section pressure. Several instruments and selector valves were recommended by instrument manufacturers for the job of choosing the highest header pressure and automatically connecting it to the low side of the differential controller. After quite a lengthy study, it occurred to us that two check valves would do the job as well as anything. Nos. 6 and 7 on the drawing are these one-inch swing check valves with one-eighth inch holes drilled through their discs. They are working perfectly and always select the highest pressure even though it be only a fraction of a pound above the other section pressure.

To maintain the desired turbine exhaust pressure, it was necessary that Controller No. 5 operate the three valves 5-A and 5-B, which are 8-inch, and 5-C, which is a 3-inch valve. The size of valve 5-A was based on the fact that in case of a sheet break, with the result that steam consumption in the dryers is decreased to practically nothing, this valve must be large enough to handle the full steam output of the turbine. It must do this without building up the exhaust pressure to the point where it would relieve to the atmosphere. Valve 5-B was made large enough to take care of deficiencies of steam when the turbine exhaust pressure is less than 40 pounds per square inch. It was calculated for a small pressure drop across the valve so that when the desired turbine exhaust pressure approached 40 pounds it still is possible to make up with the more economical mill extraction steam. The calculated deficiencies in steam when operating the turbine exhaust above 40 pounds determined that valve 5-C should be a 3-inch.

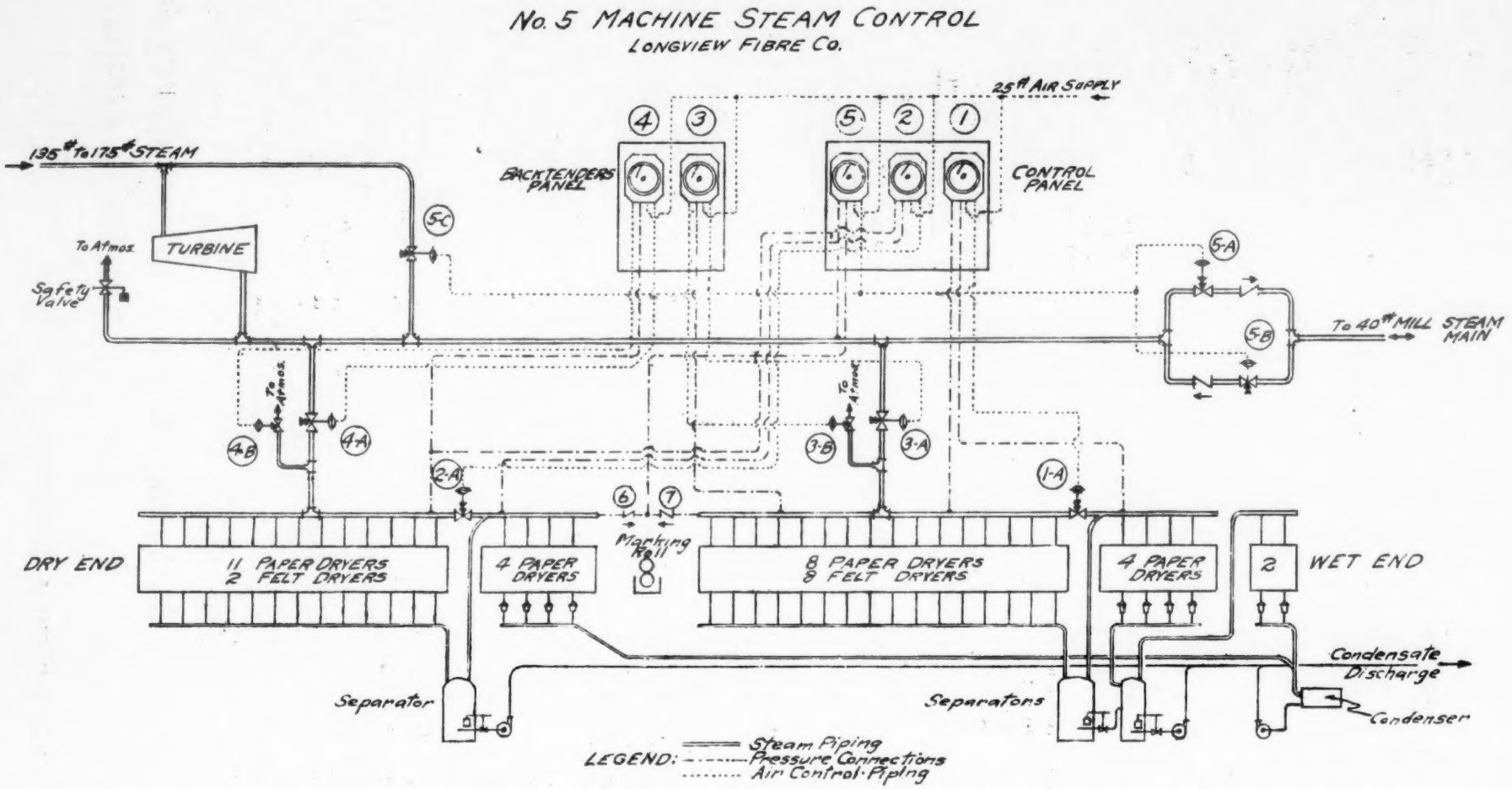
It is not possible to build a separate unit system for each one of these three valves and get them all into one controller. Therefore, it was decided to stagger the valves on one unit system. In other words, since the air supply is 25 pounds to each controller in the case of No. 5 Controller, it is split three ways. Valve 5-B operates on an air pressure of 3 to 9 pounds, No. 5-A from 9 to 15 pounds, and No. 5-C from 15 to 21 pounds. Each valve is provided with a Taylor Valve Precisor to insure positive stem travel. When there is insufficient steam being put out by the turbine to supply the dryers, the air pressure from the controller starts building up until valve 5-B from the 40-pound mill extraction line begins to open at 3 pounds of air pressure. It becomes wide open at 9 pounds. If there still is insufficient steam the air pressure continues to build up, closing off valve 5-A which bleeds back to the 40-pound line. When the air pressure builds up to 15 pounds, valve 5-C starts to open, admitting steam from the high pressure mill steam line. Likewise, when the turbine is putting out an excess of steam, the air pressure from the controller drops, closing the high pressure valve and opening 5-A to bleed back into the 40-pound mill extraction line. Valve 5-A is made large enough to take care of any excess of steam, but to provide a factor of safety a spring loaded pop valve is provided on the turbine exhaust.

When starting the control system, it was necessary to synchronize the various controllers so that the speed of response would not interfere with the turbine speed governor as well as the speed of the other controllers. Differential controllers 1, 2 and 5 have a 0 to 10 pound range, but will withstand a differential pressure of 65 pounds per square inch. This is to provide for possible failure of the pressure connection to one side of the controller, at which time the bellows system could be subjected to this much differential.

Longview Fibre's Power Sources

● The mill is a big user of steam, 4000 tons per day on the average or the equivalent of 100 tank cars full of steam every 24-hours.

Of the steam used by the Longview Fibre Company 40 per cent is generated within the mill and 60 per cent is purchased. The electric power consumed each day is 20 per cent generated by the mill and 80



per cent purchased. The purchased steam and electric power is obtained from Public Utility District No. 1, Cowlitz County, whose plant is located alongside the Long-Bell Lumber Company's sawmills. Waste wood from the sawmills is used for fuel.

The Longview Fibre Company's steam generation is all from waste heat boilers, two Wagner furnaces and two Tomlinson furnaces. A third Tomlinson unit was recently ordered together with a new 3,500 k.w. General Electric back pressure turbine. It will take steam at 400 pounds and 675 degrees from the recovery furnaces. The turbine will be installed in October of this year and the Tomlinson, which was purchased through C. C. Moore & Company, Engineers, Pacific Coast representatives for Babcock & Wilcox, will be in service early in 1942.

Auxiliary Equipment For Longview Fibre's New Machine

Stock and White Water Flow

● The stock and white water flow arrangement for the Longview Fibre Company's new No. 5 paper and board machine is of unusual interest. Rather difficult to describe in words, the hookup is clearly shown by the accompanying isometric sketch prepared by the company's engineering department for internal use and published here through the courtesy of R. S. Wertheimer, vice president and resident manager.

Two mixing chests, Agi-Flo type, on the machine room floor both dump into the jordan chest in the basement. Agi-Flo pumps circulate the stock from this chest through the main bank of jordans, returning it to the machine chest alongside the jordan chest. The Agi-Flo in the machine chest sends it to the machine head box. Color is introduced at the stuff gate from the stock head box and mixed in the 12,500 gallons per minute Bingham white water pump which sends the colored stock through the four 3-A Bird screens and through the stock flow regulating valve to the Flow Evener and onto the fourdrinier wire.

The mix chests are equipped with two No. 2 HM Shartle agitators consisting of wide area suction and discharge casings mounted on a cast iron base. The thimble between these two casings is lined with a spiral ribbed bronze sleeve. Within this sleeve is a high capacity impact type bronze impeller mounted on roller bearing equipped S.A.E. 1035 steel shaft. This shaft is shrouded so it does not come in contact with the stock. Bearings are mounted outside the casing assembly and the shaft is protected by Allegheny sleeves where it passes through the packing glands.

The impellers in these units are designed to handle 5000 G.P.M. of 4 per cent stock, and are equipped with 30 h.p. 860 r.p.m. motors. These units are equipped with slide gates to shut them off from the chests in case they have to be opened up while the chests are full of stock.

The mix chests are constructed with rounded ends and each has a mid-feather. On one side of this mid-feather and about one third of the length of the chest from one end, is a baffle, extending from the mid-feather to the side of the chest as shown in sketch No. 1. The suction and discharge of the agitator are in direct line with this baffle, but on the opposite side of the mid-feather. The agitator discharges into a trough along the top of the baffle. The stock spills over equally on both sides of the baffle and travels around the ends of the mid-feather back to the suction of the agitator again. The discharge trough is equipped with gates where it passes above the suction of the agitator. These gates are adjusted to spill over about 8 to 10 per cent of the stock to submerge any floating stock above the suction of the agitator.

The sketch D-32661 illustrates the thorough blending of three different stocks in approximately 20 minutes. The mix chests have a capacity of 5000 pounds of stock at 4 per cent consistency, and a complete turnover of the stock is completed every 3.3 minutes.

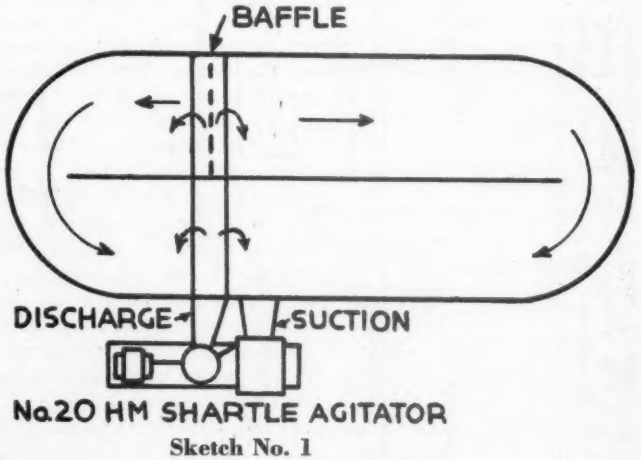
The mix chests discharge into the dump chest through four Shartle hydraulic operated 30-inch poppet valves having a 15-inch travel operated by a 14-inch cylinder.

The dump chest has a capacity of 9000 pounds at 4 per cent consistency, and is rectangular in shape with one end rounded. A mid-feather fastened to the square end extends to within a short distance of the rounded end. This chest is equipped with a Shartle No. 20-8 Miami Agi-Flo unit, which consists of a pump agitator and a stock pump mounted on the same shaft as shown in the cut-away in sketch No. 2. The agitator pump has a capacity of 4200 G.P.M. at 4 per cent consistency. The suction is on one side of the mid-feather, and the discharge is near the top of the chest on the other side of the mid-feather. This discharge is into a trough which extends through the mid-feather to above the suction of the agitator. Gates at this point allow a sufficient spill over to submerge any floating stock above the suction inlet to the agitator.

The stock pump is part of the same casing, drawing stock from the discharge of the agitator pump. This insures a constant suction head on the stock pump no matter what the level of the stock in the chest might be. This pump discharges to the jordan headbox. The stock in the dump chest has a complete turnover every 6½ minutes. The Agi-Flo unit is equipped with a 50 h.p. motor at 1160 r.p.m.

The machine chest is similar in design to the dump chest and is also equipped with a Shartle No. 20-8 Miami Agi-Flo unit, with the stock pump discharging to the machine jordans.

To insure flexibility of operation the piping system for the jordans is equipped with 12—12-inch—3 way Shartle Hope type rotary valves having cast iron bodies, bronze plugs, and non-corrosive linings where the plugs rotate in the bodies, and are equipped with position indicators and steel handles. These valves permit any combination of series or parallel operation of the jordans that might be desired.



Sketch No. 1

Five Miami Jordans

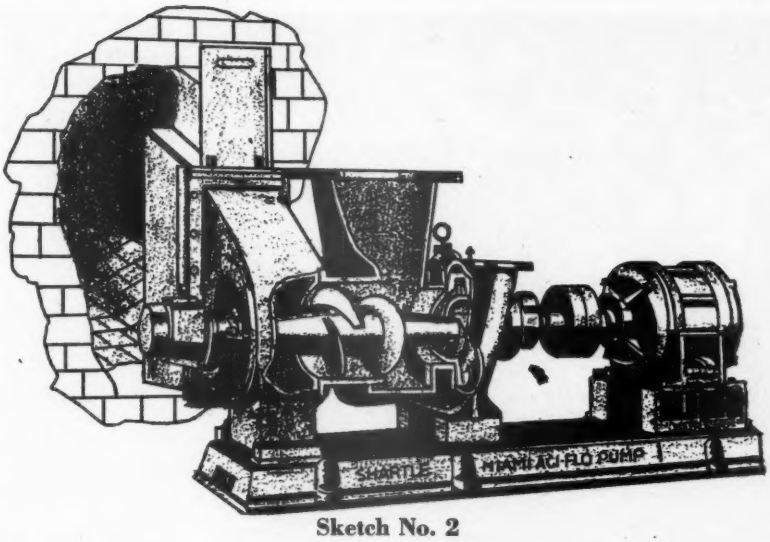
● There are five No. 5 Shartle Miami Jordans. The shell and base of the jordans are of one piece construction. The side ribs flare to the base which is flanged for bolting to the floor. The shell is 1¼ inches thick at the small end and 1¾ inches thick at the large end, and is ribbed around the body and crosswise on the underside. This construction with a proper ditsribution of metal the length of the shell, eliminates vibration which is very important in the refinement of stock.

The bearing fits, packing box fits, and taper bore of the shell are all bored in one operation, insuring the rotating plug bars being perfectly centered in relation to the stationary shell bars.

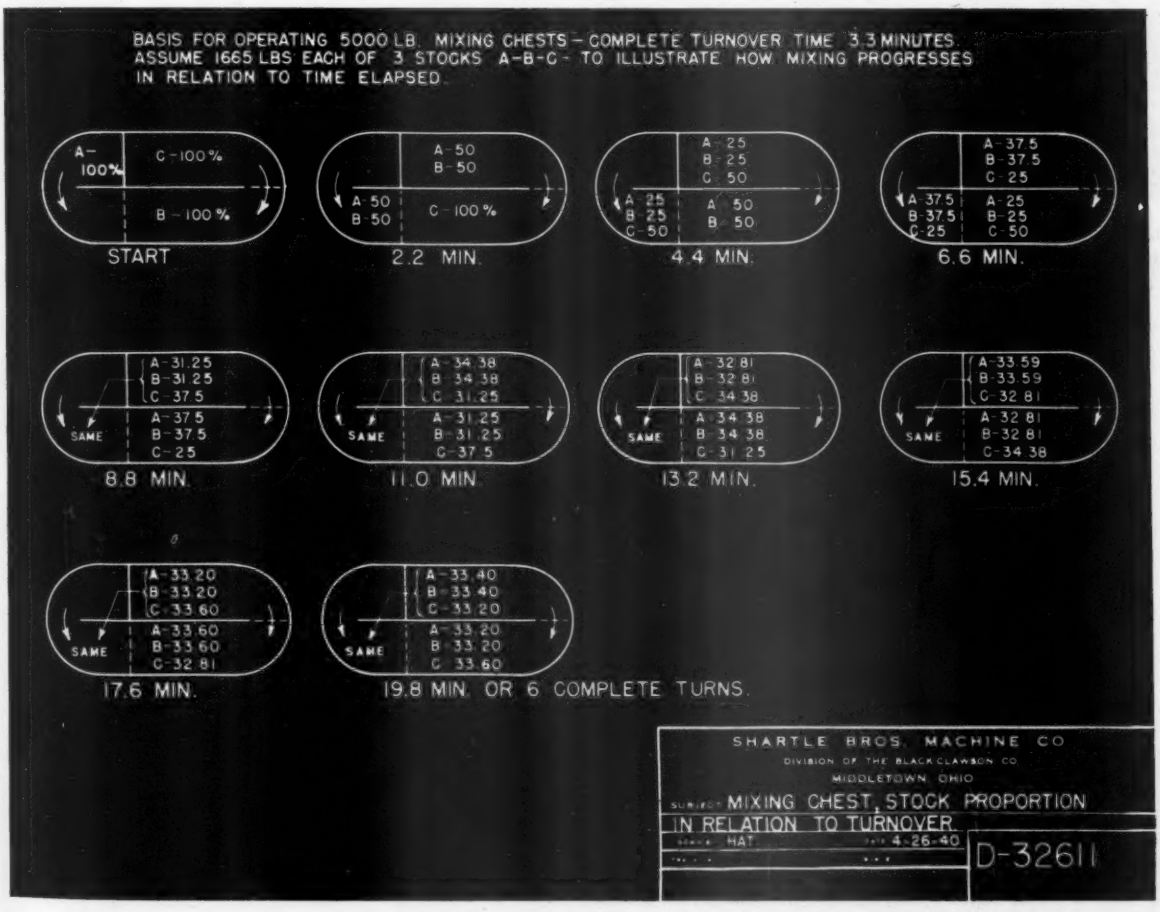
The inlet is 12 inches in diameter, opening into a large chamber at the small end of the shell which quiets the stock allowing a larger quantity to enter the small end of the plug and shell, giving it an undertow effect which assists the centrifugal action resulting in larger stock production with less power.

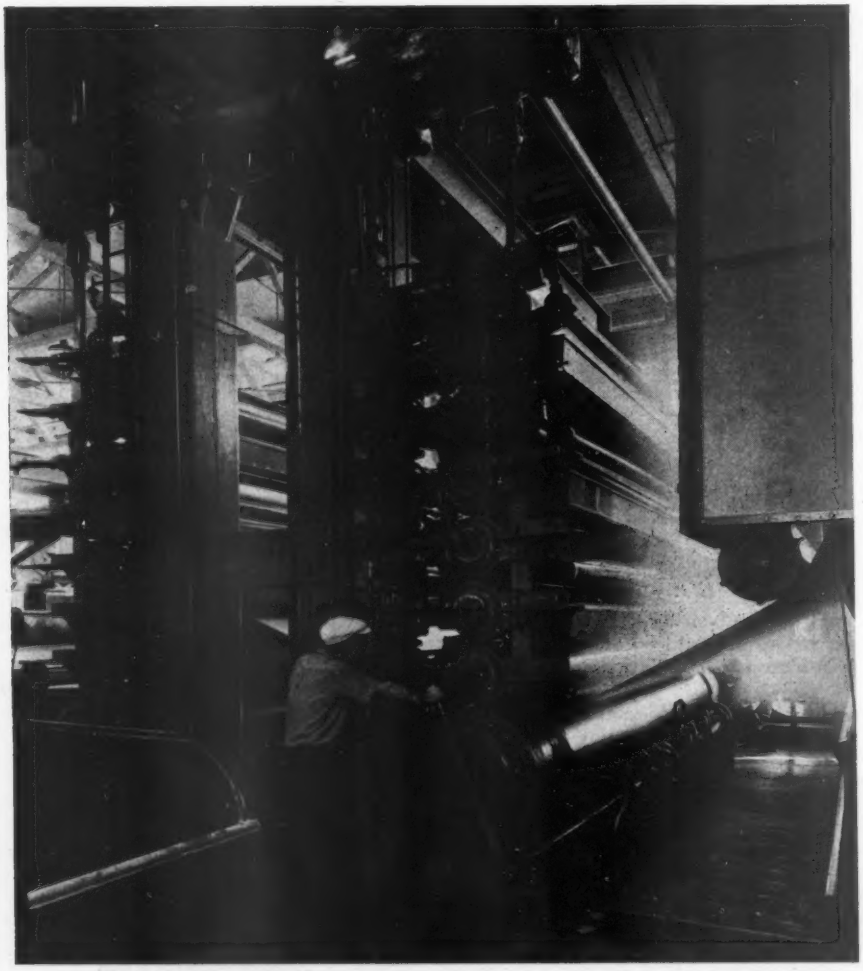
The main head is held to the body by eight heavy steel "T" bolts, and the whole assembly of head, plug and shaft, bearings, and packing boxes can be removed as a unit with a minimum amount of time and effort.

The plug is of semi-steel with slots 1-inch deep extending the full length of the plug body. This insures the bars having support along their entire length. The bars are punched with lugs that extend under seven rings of Norway iron shrunk on to the plug body. The bars are rolled with a bead on both sides that come above the body of the



Sketch No. 2





Two Beloit Open Sided Calender Stacks equipped with SKF bearings throughout ✓ ✓ ✓ Rice Barton Calender Doctors ✓ ✓ ✓ Motor operated roll lifts.

plug. The woods are driven between the bars endways and the beads on the bars prevent the woods from rising when the jordan is in operation. This construction prevents any vibration of the plug or bars resulting in longer bar life and safer operation.

The plug shaft is 6¼ inches in diameter and is made of special alloy steel and equipped with 6¾-inch diameter bronze sleeves where it passes through the packing glands. The whole assembly of plug, shaft and bars is put in static and dynamic balance before leaving the plant. Provision is made in the plug assembly for rebalancing when the plug is refilled.

The thrust screw has a direct thrust along the center line of the plug and allows for a plug travel of 9 inches. The hand wheel is equipped with micrometer adjustment indicators, allowing the operator to duplicate any previous setting at any time.

The plug shaft radial and thrust bearings are of special design, and are equipped with large oil chambers, oil level gauges, and double piston sealing rings to prevent oil leakage.

Each jordan is equipped with a 400 h.p. 360 r.p.m. Westinghouse synchronous motor.

Other equipment supplied by the Shartle Brothers, Division of the Black-Clawson Company, for this job was a perforated backfall to convert an ordinary beater into a broke beater.

Dilts Machine Works Division supplied four 24-inch in diameter propeller type horizontal agitators, using 5 h.p. gearmotors 146 r.p.m. These units were used in existing beater tubs, the beater rolls having been removed.

With the addition of the five new jordans the Longview Fibre Company now has 22 Shartle Miami jordans operating on five paper and board machines.

Bird Screens

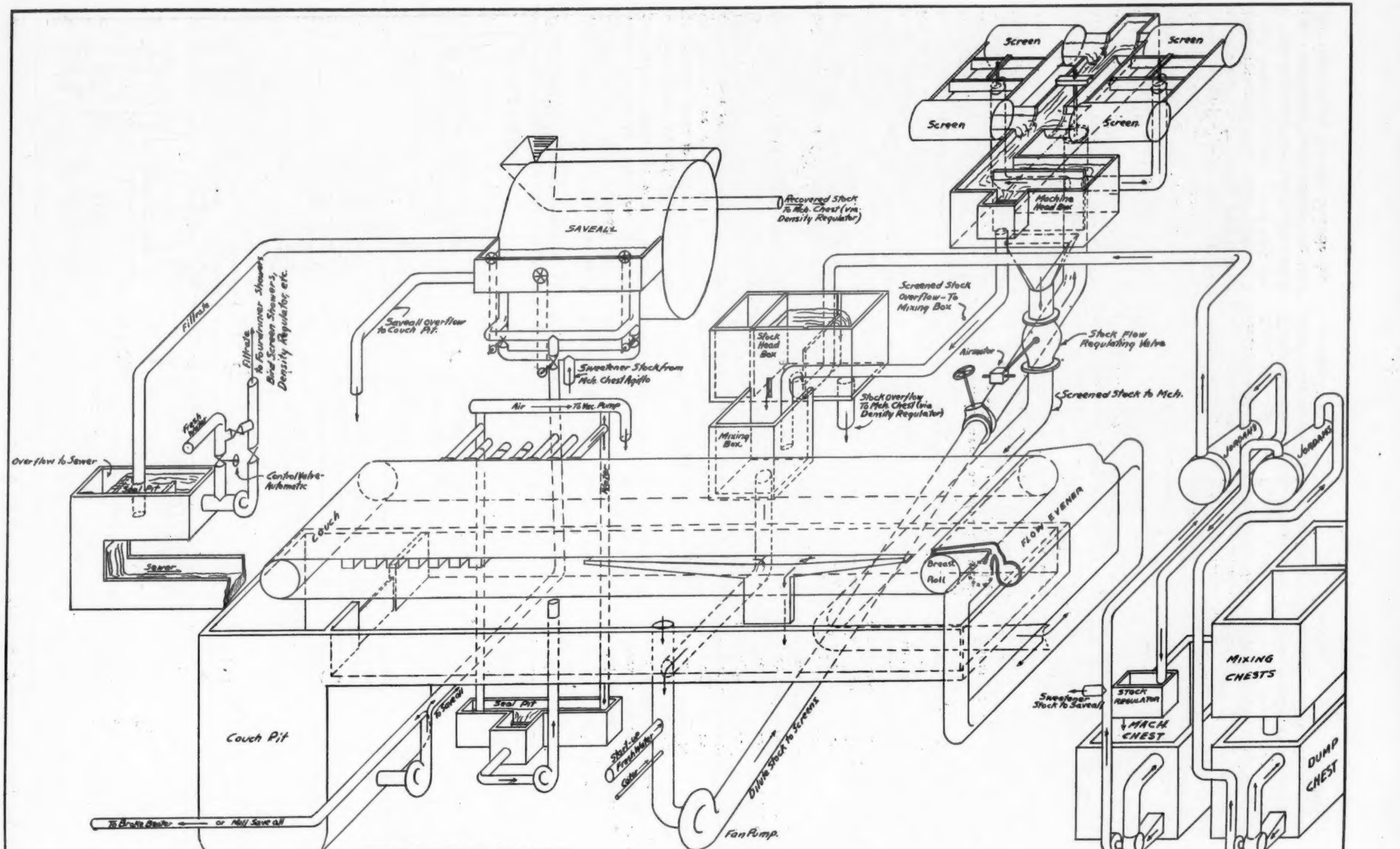
● Four large 3-A Bird screens, made by the Bird Machine Company of South Walpole, Massachusetts, screen the stock for the new No. 5 paper machine. These are of the latest design, dual drive type and provide ample capacity of clean stock. This is the second repeat order the Longview Fibre Company has placed for Bird Screens.

Oliver Saveall

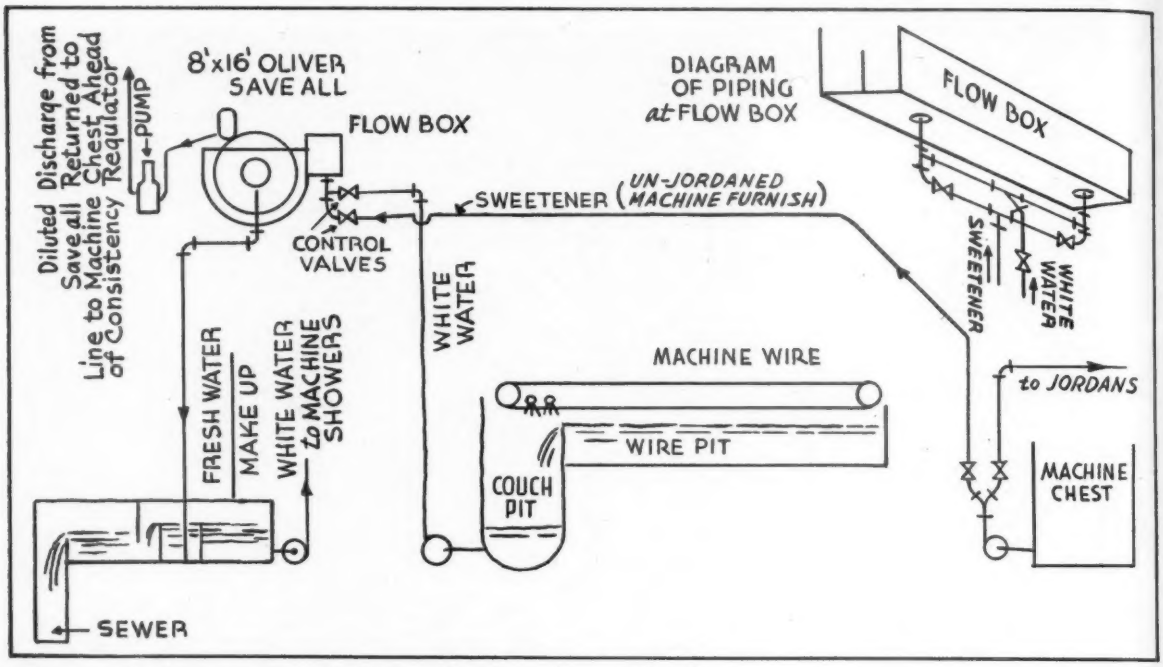
● An 8-foot in diameter by 16-foot face Oliver Saveall is installed to handle the whitewater from the new No. 5 paper machine. The whitewater is pumped from couch pit of the machine to the flow box on the saveall. A predetermined amount of partially jordaned machine furnish is added to the whitewater line just ahead of the flow box. The mixture of whitewater and the furnish, which acts as the sweetener, is fed into the saveall tank from the flowbox. Vacuum in the saveall cylinder is induced by an 8-inch barometric leg. The sheet is removed from the cylinder with an Oliver vacuum discharger. A screw conveyor on the discharger conveys the discharged stock to a chute at one end of the saveall. The stock drops through the chute into a Bingham decker pump which pumps the stock to the line leading to the machine chest. The stock enters this line ahead of the consistency regulator. A large proportion of the filtrate is returned to the mill for shower water, the balance being sent to the sewer.

The Oliver saveall has a copper lined steel tank and a steel drum entirely sheathed with silicon bronze. The drive is by a splash proof motor through a Reeves variable sped unit. The drive on the saveall itself is through heavy steel spur gears. The speed change on the Reeves transmission is actuated by a diaphragm in the tank head which responds to the varying height of pulp in the saveall tank.

The vacuum discharger is made of solid silicon bronze and the exhaust fan and scroll are both driven by splash proof motors. A recipro-



STOCK AND WHITE WATER FLOW SHEET
FOR No 5 PAPER MACHINE
LONGVIEW FIBRE COMPANY



Diagramatic Arrangement of Oliver Saveall on No. 5 Machine.

cating shower driven by a separate splash proof geared head motor keeps the facing wire clean with the minimum amount of water.

The entire saveall is constructed so that all parts in contact with pulp or filtrate are of silicon bronze or copper (See sketch showing arrangement).

Consistency Regulation

Consistency is regulated by a Control Equipment Company regulator sold by the Pacific Coast Supply Company. Four other C-E regulators control the consistency of stock for Longview Fibre's other four machines.

Agitator Drives

Broke from the new No. 5 machine is repulped in a broke beater and then stored for use in two broke chests. Constant agitation of the stock is provided through two vertical propellor agitators driven through Pacific-Western vertical agitator drives made by the Western Gear Works of Seattle.

Stebbins Linings

● In planning the installation of the new No. 5 machine the Longview Fibre Company endeavored to keep the stock free of all contamination through the use of stainless steel, bronze, rubber, wood and tile.

Consequently the wire and couch pits are lined with white tile and the four chests for the Shartle Agi-Flo systems are of hollow tile construction. Two diffuser chests for the new digesters are lined with vitrified tile. Beaters are tile lined, too.

All the tile lining work was done by the Stebbins Engineering Corporation of Seattle.

Vacuum Pumps

● Vacuum for the suction presses and the suction boxes is provided by five L-9 Nash vacuum pumps, made by the Nash Engineering Company of South Norwalk, Connecticut.

Color Tanks

● Color tanks for the new No. 5 paper machine are of Allegheny 18-8 stainless steel, all electric welded. There are 6 tanks each 66 inches in diameter and 84 inches in height and one tank 3 feet in diameter and 2 feet in height. These tanks were manufactured by the Alaskan Copper Works of Seattle who also supplied the copper piping connecting the color tanks with the stock system.

Instruments

● Recording and controlling instruments for the new No. 5 machine were furnished by the Taylor Instrument Companies of Rochester, New York, through their Portland office. These are described in detail in the article on steam control of No. 5 machine.

Electrical

● All of the alternating current motors, control equipment, main power distribution switching equipment and secondary distribution apparatus for the No. 5 paper machine was supplied by the Westinghouse Electric & Manufacturing Company through the Portland office.

There are five 500-h.p., 400 r.p.m. 80 per cent power factor synchronous motors driving the Miami jordans. These are controlled by class 14-250 full voltage magnetic starters. The L-9 Nash vacuum pumps are driven by 225-h.p. synchronous motor, 300 r.p.m., 100 per cent power factor, two pumps by each motor. These are controlled by class 14-245 magnetic, full voltage starters.

Most of the miscellaneous alternating current motors have their controls mounted in two cubicle type distribution centers located on the balcony at the back side of the machine. These same cubicle distribution centers also house the secondary distribution circuits which are fed by type A.C. De-ion circuit breakers.

The main power distribution switchboard is located in the same room with the cubicle type control equipment and consists of two 1200 ampere and five 800 ampere type DA-50 De-ion circuit breakers. These breakers have an interrupting capacity of 50,000 amperes at 440 volts.

Conclusion

● In the preceding articles the story of an industry successfully developed from an idea that Douglas fir sawmill waste could be utilized in the production of kraft paper and board, has been outlined, together with a detailed description of its latest forward step. Its beneficial contributions to the city of Longview and to many other towns and cities are clearly apparent.

The presentation of this story of sawmill waste utilization has been made possible through the cooperation of many people. PACIFIC PULP & PAPER INDUSTRY wishes to thank them for their help and to especially thank Robert S. Wertheimer, vice president and resident manager of the Longview Fibre Company, for his very fine cooperation.

Hawley To Pay Preferred Dividends After 10-Year Lapse

● John H. Smith, president of the Hawley Pulp & Paper Company, Oregon City, Oregon, in his annual statement to stockholders said that the beginning of payments on the first preferred stock during the second quarter of 1941 is anticipated. No dividends on this stock have been paid for slightly more than ten years.

This announcement reflects the rapid recovery of the Hawley organization under the present management. President Smith told stockholders that the company is now entirely free of debt.

At the end of 1939 the company reported an operating deficit of $221,175,84, but at the close of business December 31, 1940, the company reported a net profit before taxes of $943,033.96. Net profit for 1940 after taxes was $436,405.77.

Current assets at the close of 1940 were $1,835,675.79 and current liabilities were $901,345.93, a ratio of 2 to 1. Capital and surplus total $5,951,329.46 and total resources $6,862,788.46.

Net sales of the Hawley Pulp & Paper Company in 1940 were $4,757,088.52. Cash in the bank as of December 31st was $250,875.

President Smith said in part, "last year your company set a record in both production and sales and at present is continuing capacity operations; but we feel the picture is too uncertain to warrant any forecast."

J. D. Zellerbach Now a Grandfather

● Fifth generation of the papermaking Zellerbach family, and fourth of living Zellerbach generations, James D. Zellerbach III was born to Mr. and Mrs. J. D. Zellerbach, Jr., of Hillsborough, California, on December 26, 1940. The boy weighed eight pounds and five ounces. I. Zellerbach, the great grandfather, is chairman of the executive committee of Crown Zellerbach Corporation. J. D. Zellerbach, Sr., the grandfather, is president of Crown Zellerbach Corporation and J. D. Zellerbach, Jr., the father, is attached to the Industrial Relations department of the corporation.

Westminster Making Improvements This Year

● Official announcement of Westminster Paper Company's expansion plans is being withheld until plans have reached a more definite form, but it is understood that about $300,000 will be expended on various improvements during the coming spring.

"At first we planned merely a general renovation program," said Elmer Herb, manager of the British Columbia paper specialty mill organization. "We drew up specifications on that basis last fall, but since then other considerations have developed and it may be feasible to proceed with a more extensive plan."

Increased power and more drying capacity are said to be contemplated, but officials of the company declined to comment on this suggestion. It is understood that Westminster Paper Company does not intend to branch out into new fields of production, but rather to increase volume of present lines which are finding a ready market.

Annual meeting of the company is expected to be held in New Westminster some time in April, and by then the plans may shape up into something more definite than at present.

Russell Cooper Now In Powell River

● Russell Cooper, newly appointed general superintendent of the Powell River Company's mills, was in Vancouver this month meeting members of the executive staff, after which he went north to his new job.

Mr. Cooper was formerly superintendent of the Ontario Paper Company.

Dry End of No. 5 Machine ' ' ' Two-drum winder with motor driven rider roll and power operated roll ejector ' ' ' Note system for weighing rolls before they are taken by crane and truck to warehouse, bag or box plant.

Stockton Credit Union Has Outstanding Record

● An outstanding record has been made by the employees' credit union of the Stockton Division, Fibreboard Products Inc., Stockton, California.

The Stockton Division credit union was organized in February, 1937, and at the end of that year had assets of $23,148.74; at the end of 1938 assets were $45,650.73; at the end of 1939, $70,642.39, and as of December 31, 1940, total assets had grown to $97,863.00.

During 1940 cash was handled to the amount of $125,264.00, and $87,836.00 was loaned during the year, making a total of $248,817.00 loaned since the organization of the credit union.

A 6 per cent dividend was declared following 1940 operations, distributing $3,859.00 to the membership—a total of $8,536.00 since the organization of the credit union.

The credit union started with 15 members and has grown to 548.

According to officers of the credit union the greatest factor contributing to its growth has been the pay roll deductions, which have been made possible through the courtesy of the management of Fibreboard Products Inc. These pay roll deductions enable the employees to continue their savings and pay off their loans in a convenient and almost painless manner.

While the credit union is an independent organization managed by and for the employees, the management of Fibreboard Products Inc. has accorded every encouragement and facility, cooperating in its success.

A. R. Shade, one of the pioneers in organizing the credit union, has served as chairman of the all-important credit committee, which passes on all loans. As evidence of the committee's good judgment is the fact that the credit union has never had to write off a bad loan.

The purpose of the union is to promote thrift; provide a convenient means of accumulating savings, and for obtaining money for providential purposes.

The credit union endeavors to offer the borrowers counsel when they obtain loans and to keep the borrower from making uneconomic purchases.

When the credit union was first organized the bulk of the loans were "distress" loans to relieve members from excessive debts and oppressive installment payments. In the past few years this type of loan has diminished and loans are now of a more constructive type, with the usual run of loans for emergencies such as sickness and operations.

Present officers of the Stockton Fibreboard Credit Union are: Ray Christie, president; F. C. Erz, vice president; J. D. Gallagher secretary-treasurer; and F. E. Cook, Ainsley Boston, Calvin Leple, and V. A. Young, directors.

A. R. Shade is chairman of the credit committee, and Ralph Beauregard, and Charles Orr, committeemen.

On the supervisory committee are: Hollis Reed, chairman; Norman Burke, Carl Bellups, E. Castillo, and Frank Foote.

All other Fibreboard Products Inc. divisions also have well organized credit unions which are showing very excellent results.

Tore Ahlin Married In Seattle

● Tore Ahlin, engineer for A. B. Svenska Flakfabriken of Stockholm, Sweden, makers of the Flakt pulp dryer, was married in Seattle March 8th, to Miss Astri Mohlin of Stockholm.

The wedding took place in the Gethsemane Lutheran Church of Seattle at 5 o'clock and was followed by a supper at the Washington Athletic Club. Mrs. A. H. Lundberg was matron of honor and A. H. Lundberg was best man.

Mrs. Ahlin arrived in the United States February 24th after a six week's journey from Stockholm. She came by way of Finland and Russia spending ten days on the Trans-Siberian Railroad. From Vladivostok she went to Japan and thence to Vancouver, B. C.

After a honeymoon in California and Arizona Mr. and Mrs. Ahlin will be at home at the Exeter Apartments in Seattle early in April.

Fernstrom Now Buying All Northwest Pulp

● The Fernstrom Paper Mills, Inc., of Pomona, Calif., according to F. O. Fernstrom, president, recently completed arrangements with three Pacific Northwest mills for all its pulp requirements on a permanent basis. They are the Spaulding Pulp and Paper Company, Puget Sound Pulp and Timber Company and the Pulp Division, Weyerhaeuser Timber Company.

CREDIT UNION OFFICERS of the Stockton, California, Division, Fibreboard Products, Inc. / / / Left to right, J. D. GALLAGHER, Treasurer; A. R. SHADE, Credit Committee Chairman; RAY CHRISTIE, President; F. E. COOK, E. CASTILLO, RALPH BEAUREGARD, Credit Committee Members; F. C. ERZ, Vice President; CARL BILLUPS, V. A. YOUNG, NORMAN BURKE, and AINSLEY BOSTON, Credit Committee Members.

GREAT WESTERN DIVISION
BEAR BRAND PRODUCTS
THE DOW CHEMICAL COMPANY

Bear Brand

CHEMICALS INDISPENSABLE TO THE PAPER INDUSTRY

Cl_2

CHLORINE

Liquefies at-34.6°C. at atmospheric pressure. Not over 1.4 lbs. moisture per ton. Total residue not over 15 grams per 100 lbs.

SO_2

SULPHUR DIOXIDE

Liquefies at -10°C. — atmospheric pressure.

NH_3

ANHYDROUS AMMONIA

Contains no objectionable impurities such as pyridine, acetronitrile, naphthalene, hydrogen, sulphide, organic acids or ether organic compounds.

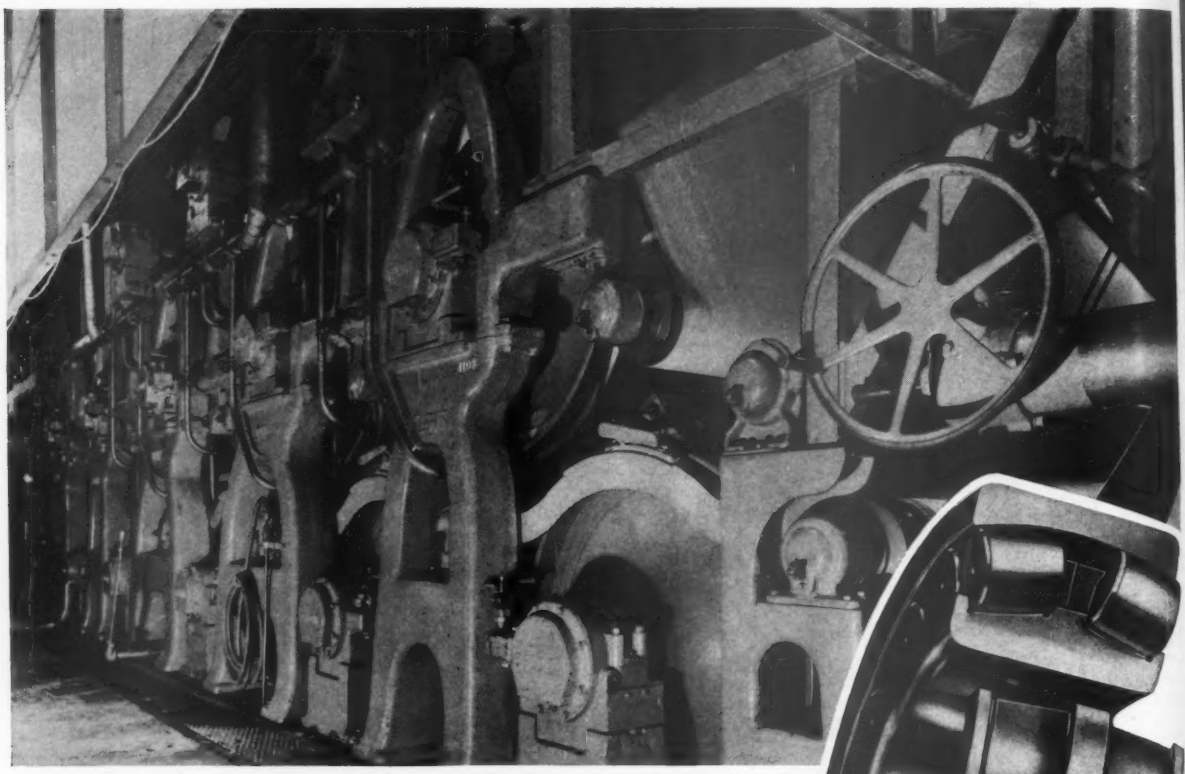
ZnS_2O_4

ZINC HYDROSULPHITE

A fine white powder. Easily oxidizable in air. Very slightly water soluble.

GREAT WESTERN DIVISION
THE DOW CHEMICAL COMPANY

SAN FRANCISCO, CALIFORNIA
PLANT: PITTSBURG, CALIFORNIA
NEW YORK, SEATTLE, LOS ANGELES



Dryer section consisting of 39 dryers, 60" in diameter and divided into two independent sections, built by Beloit Iron Works for the Longview Fibre Company. Besides these dryers, SKF Bearings are on the double calender stack, suction press rolls and many miscellaneous locations.

Beloit Does it Again

WITH SKF BEARINGS

Congratulations, Beloit Iron Works. You know a better way to keep the dryer section of the No. 5 200-inch Fourdrinier Paper and Board Machine at Longview free from bearing trouble than by depending on an oil can. You picked SKF Bearings to permit shaft expansion and contraction without imposing extraneous thrust loads on bearings or side frames. In short, you put the right bearing in the right place.

SKF INDUSTRIES, INC., PHILA., PA.

4310

ROLLER SKF BEARINGS

Wisconsin Sulphite Makers Report on Waste Studies

● Executive representatives of the Sulphite Pulp Manufacturers' Committee on Waste Disposal met the other day to review the status of their program, which has just completed its first year. Careful study was given to the organization's several projects, plans were laid for 1941, and a policy was adopted, designed to enlist the support of large non-Wisconsin producers who may care to participate in the program.

After a series of meetings with state representatives in late 1939, the Committee was formed by companies producing over ninety per cent of the sulphite pulp produced in Wisconsin. Its purpose is to study collectively and vigorously the problem of disposing of industrial wastes. Over a period of years, individual pulp companies have striven to improve waste conditions. In several instances prodigious efforts have been made and literally millions of dollars have been expended without finding a solution which can be generally applied to the industry. The current program is an acknowledgment of the facts that waste disposal is a subject which is so complicated and at the same time so significant that it requires the combined attention of all involved.

The program, which is projected over a five-year period, may be separated into three distinct phases. The first phase deals with biological methods of waste disposal. In this direction, the Committee has already made considerable progress by completing a laboratory study of the trickling filter as a means of handling waste sulphite liquor. A trickling filter may be described roughly as a pile of rock or broken stone, each piece being from two to three inches across, the height and area of the pile depending upon the volume of waste material to be handled. The wastes are sprayed over the top of the pile and allowed to trickle down through the rock. The poluting characteristics of the waste are diminished in this process by bacterial action.

The experiments of the Committee have demonstrated that under laboratory conditions this mechanism is fairly effective in removing approximately eighty per cent of the pollution. The next step is to determine whether the method is physically and economically feasible for large scale operation. Plans are being laid for the installation and operation of a pilot plant, which should permit an anthoritative conclusion on this approach.

There are other biological methods for waste disposal, and the Committee intends to investigate at least one of these, namely, methane fermentation, during 1941. Professor Busswell of the University of Illinois has done some very interesting work with this method of disposal, and the Committee has decided that the process has sufficient possibilities to justify exploring its application to waste sulphite liquor.

A second phase of the program relates to the possibility of handling waste liquors by evaporation and incineration. During the past year the Committee has made a very careful study of several of these methods in order to estimate their comparative merits and their practicability from economic and technical standpoints. The evidence which has been gathered is quite enlightening. Enormous capital investments would be involved in such systems, and in the absence of tangible data as to operating variables, the Committee finds that it is necessary to supplement its current knowledge by a careful study of certain large scale operations that are either under consideration or are currently in operation or in course of construction.

The primary objective of the study has been to find a suitable means of disposing of the waste liquor. A secondary objective, and one which is economically and technically more ambitious, is the discovery of some satisfactory means of utilizing the wastes. This objective constitutes the third phase of the program. Complete utilization would, of course, automatically solve the problem of disposal and at the same time would have the very desirable result of conserving greater percentages of the raw materials than present methods will allow.

As a first step in the planning of a research program, the Committee has assembled a complete bibliography of waste liquors through the offices of The Institute of Paper Chemistry, Appleton, Wisconsin. The bibliography, in book form, includes more than six hundred pages of finely condensed references to previous investigations in this direction. These previous endeavors have been studied carefully for the purpose of eliminating the least promising avenues for new research. On the basis of a critical analysis of these earlier efforts, The Institute of Paper Chemistry is now organizing an ambitious research program, to which the Committee will give effective support.

It is impossible to predict when or if the research program will culminate in a practicable utilization of waste. This is appreciated when one realizes that the field has been diligently studied for over sixty years. Recognizing the urgency of the problem, however, the Committee's program is outlined on a five-year maximum basis with the hope that some equitable solution may be uncovered before that period has expired.

While the disposal study was originally organized by companies with pulp mills located within Wisconsin, an arrangement has been made whereby out-of-state manufacturers can cooperate. Already there is one Michigan company which has joined the Committee, and others have manifested considerable interest in the program. In view of such participation, the Committee has revised its basis of assessment to permit companies of very large production facilities to cooperate upon more reasonable terms. The regular rate of assessment is ten cents per ton of pulp produced. The new plan will apply this rate of assessment to the first one hundred thousand tons of pulp per year, and after that volume has been accounted for, a maximum contribution of $10,000 per company per year will pertain. It is provided, however, that if the base rate of assessment is raised, the maximum figure will be proportionately raised.

A review of the first year of the Sulphite Pulp Manufacturers' Committee on Waste Disposal shows that considerable progress has been made on a very difficult problem. Through the efforts of The Institute of Paper Chemistry and a special consultant, considerable data have been collected, laboratory experiments have been sufficiently promising in certain directions to warrant pilot plant operation, and the groundwork has been thoroughly laid for a significant and vigorous research program.

Camas Man Holds Important Position in Draft Organization

● Major William "Bill" Hart, formerly assistant to the manager of the order department. Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, at Camas, Washington, has been named chief of the headquarters division of the national headquarters of the selective service system, Washington, D. C. His new duties embrace supervision of administrative functions of national headquarters. He left the employ of the company September 1st, 1940, for the military service.

Camas To Build Converting Addition

● A four-story addition is to be built onto the converting plant of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, at Camas, Washington, according to Resident Manager J. E. Hanny.

This is to be a concrete building 105 by 120 feet, with a floor space of 50,000 square feet. Napkins and other converting plant products will be stored in the new structure.

Building specifications are being prepared and the contracts will be let about the middle of March.

Harold Cavin Breaks Leg Skiing

● Harold C. Cavin, consulting engineer of Bellingham, in charge of the expansion program currently under way by the Puget Sound Pulp & Timber Company, suffered a broken leg while skiing at Mount Baker February 23rd.

The accident occurred while a party of five men were skiing on a large snow field almost on the top of Table Mountain. With Mr. Cavin were Harry L. Marshall, consulting engineer of Seattle; Earl G. Thompson of the Dow Chemical Company, Seattle; Arne Jensen of Everett; and Tore Ahlin of Stockholm, Sweden, who has been in this country for the past year as engineer for A. B. Svenska Flakfabriken, makers of the Flakt pulp dryers.

While Tore Ahlin skiied down the steep slopes of Table Mountain to summon a doctor and a toboggan, Harry Marshall, Earl Thompson and Arne Jensen applied first aid in the form of an emergency traction splint of ski poles. Later, the physician said that this prompt action prevented Mr. Cavin from suffering a compound fracture. His right leg was broken in two places.

After two weeks in a Bellingham hospital he went home on March 10th and expects to be back on the job at the mill the latter part of the month, but will find it necessary to use crutches for a while.

These VERTICAL HELICAL GEAR DRIVES on stock chests alongside the Longview Fibre Company's new No. 5 paper machine, are but one example of PACIFIC-WESTERN'S Specially Designed Gear Units for the PULP AND PAPER INDUSTRY.

Whether the requirement is to drive a bleach cell, paper machine or a conveyor, PACIFIC-WESTERN has Time-Tested Designs, Modern Equipment and Skilled Workmen to produce efficient, trouble-free gear units.

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GEAR SPECIALISTS ◆

Western Gear Works
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SAN FRANCISCO SEATTLE LOS ANGELES

St. Helens Report Shows Improvement

● The 1940 report of the St. Helens Pulp & Paper Company, St. Helens, Oregon, manufacturers of kraft pulp, paper and converted products, shows a big improvement in net profit over 1939. Last year the company, of which Max Oberdorfer is president and general manager, made a net profit of $414,059 after all charges, or $2.07 per share. In 1939 the total net profit, after all charges, was $316,970 or $1.55 per share.

Before charges operating profit in 1940 was $900,047 against $617,329 in 1939, an increase of $282,718 or 45.8 per cent. Sales were not reported.

As of December 31, 1940, the St. Helens balance sheet showed current assets of $1,231,941, including cash of $251,427, and current liabilities of $457,417, leaving working capital indicated at $774,524, and a current assets ratio of 2.7 to 1.

At the end of 1939 the current assets were $989,149, including cash of $129,332 and current liabilities of $331,279, leaving a working capital of $657,870, and a current position of about 3 to 1.

As the company did a larger volume of business in 1940 the year end inventories totaled $677,853 against $530,746 at the close of 1939 and $599,210 at the end of 1938.

Taxes jumped in 1940 with federal income, excess profit and state tax accruals amounting to $240,794, compared with $86,484 in 1939 and $90,695 in 1938.

In 1940 St. Helens paid $1.60 per share in dividends against $1.30 per share in 1939. Balance sheets comparisons for the years ending December 31, 1940, and 1939 follow:

Assets	1940	1939
Cash	$ 251,427	$ 129,332
Notes and accounts receivable (net)	302,661	329,071
Inventory	677,853	530,746
Total current assets	$1,231,941	$ 989,149
Cash val. ins. policies	$ 69,935	$ 62,728
Plant and equip. (net)	2,768,407	2,808,291
Deferred items	46,477	36,290
Total assets	$4,116,760	$3,896,458
Liabilities		
Accounts payable	$ 141,928	$ 178,233
Accrued wages	32,040	32,767
Taxes accrued	283,449	120,279
Total current liabil.	$ 457,417	$ 331,279
Cap. stock ($10 par)	$1,999,340	$1,999,340
Capital surplus	1,031	1,031
Earned surplus	1,658,972	1,564,808
Total liabilities	$4,116,760	$3,896,458

Puget Sound Men Form Credit Union

● Employees of the Puget Sound Pulp and Timber Company of Bellingham met the evening of January 27th and organized a credit union known as Puget Pulp Credit Association. Members of the different committees are as follows: Credit Committee, Melvin Bakkom, Stanley Lewis and Tom D. Hutchinson. The Auditing Committee consists of Ed R. Scribner, Arthur Isaacson and Sidney Gibson. The directors include Carl Paulsen, William O'Grady, R. Cameron, Stanley Lewis, Ed R. Scribner, Tom D. Hutchinson, Arthur Isaacson, Sidney Gibson and Melvin Bakkom. The elected officers who will direct the union for the next year were as follows: president, R. Cameron; vice president, Sidney Gibson; secretary-treasurer, Tom D. Hutchinson.

The first official business of the group was to affiliate with the State of Washington Credit Union.

Elks Honor Puget Sound Men

● Executives and supervisors of the Puget Sound Pulp and Timber Company were feted at a banquet tendered them by Elk's Lodge 195 in the lodge home on the evening of February 27th. Following the dinner, the toastmaster, Peter Snyder, asked Glen Crout of the pulp mill to introduce the members of the pulp mill group. He then called on Mr. Ossian Anderson, president of the pulp company, who discussed the international political and economic situation as seen through the eyes of a pulp mill operator. Mr. Charles A. Sather, prominent Bellingham attorney, responded for the Elks Lodge and congratulated Mr. Anderson for the splendid company he had brought to Bellingham. Those in attendance from the pulp mill were: Ossian Anderson, Walter De Long, Lawson Turcotte, Carl Sahlin, Glenn Crout, Robert Gregory, Walter Sewall, Arthur Berthiaume, Sidney Collier, Charles Carter, E. Ericsson, Herbert Metcalf, Guy Lowman, Harry Culver, Gordon Morseth, Fred Gilmoe and Frank Brown.

Camas Men Transferred to San Francisco

● George Patterson, Lyle Tidland, Jack Ziegler, Bob Giegler and Bob Moisant, all formerly of Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington, have been transferred to the San Francisco offices of Crown Zellerbach Corporation.

Roy Malcom, also formerly of the Camas mill, is now at Sacramento, California, with the Zellerbach Paper Company.

Russell de Lopez Heads Reserve Officers

● Russell E. de Lopez, assistant traffic manager of the Puget Sound Pulp & Timber Company, Bellingham, was recently elected president of the Bellingham Chapter, Reserve Officers Association of the United States.

Mr. de Lopez, who holds a commission as first lieutenant Quartermaster Corps Reserve, will hold office through 1941 unless called to active duty.

Oregon Pulp & Paper Reports 1940 Profit

● The Oregon Pulp and Paper Company, Salem, Oregon, had the most profitable year in 1940 of any year since the depression, according to F. W. Leadbetter, president, in his statement to the stockholders.

Gross sales of products was about $1,000,000 more than in 1939, or a total of $3,600,000. In 1939 there was a deficit. For 1940 net profits, after normal income taxes and depreciation were deducted, were $361,390, and after deduction of excess profits tax will be between $250,000 and $300,000.

With all bank indebtedness paid up and six months' raw materials and supplies on hand, there is a cash balance on hand of $350,000.

E. A. Cabble Visits Pacific Coast Mills

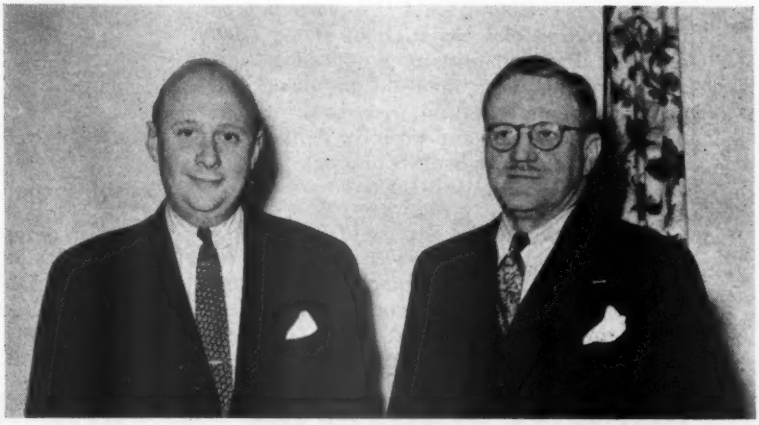
● During February a large number of Pacific Coast pulp and paper mills were visited by E. A. Cabble, member of the firm of Wm. Cabble Excelsior Wire Mfg. Co., of Brooklyn, N. Y. Mr. Cabble was accompanied by his company's Pacific Coast representative, Alan C. Dunham of Portland, Oregon.

The Cabble family has been making wires in the United States for 93 years. The business was founded by William Cabble in England in 1840. In 1848 he moved to Brooklyn.

E. A. Cabble left Brooklyn January 10th and spent three weeks in Mexico with the mills there, San Rafael and Loreto. He started calling on Pacific Coast mills in Los Angeles. In Portland Mr. Dunham met him and they visited the Pacific Northwest mills together. Mr. Cabble said he was not only glad to get acquainted with the men in the Pacific Coast industry but was happy about having chosen this time of year for his visit, thus escaping the worst of the New York weather. He expects to make an annual trip to the West Coast.

Mr. Dunham remarked that much to his sorrow he had found Mr. Cabble had a golf handicap of 3, and he was warning the golfers among the mill men they were calling upon that they were up against real competition when playing Mr. Cabble.

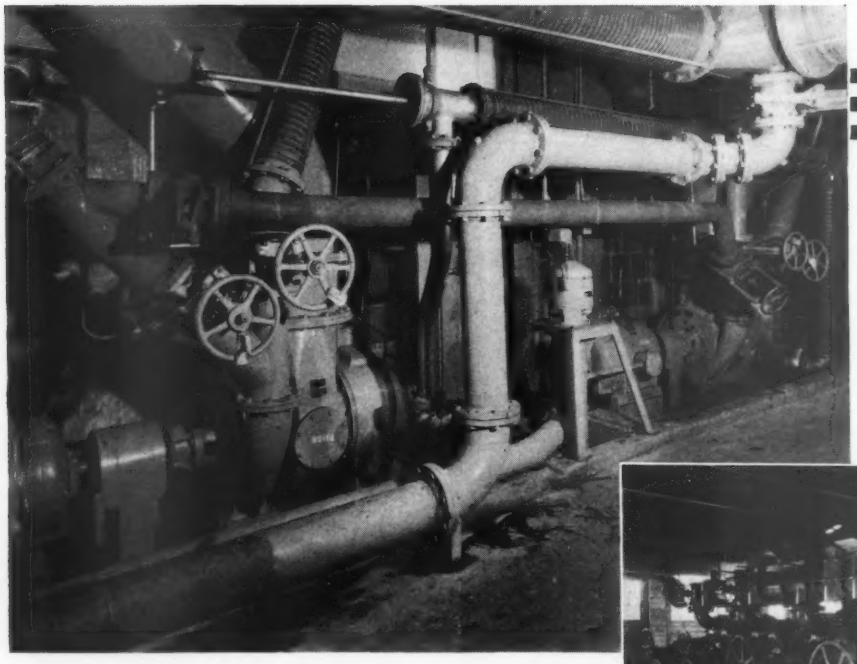
The Cabble firm manufacturers fourdrinier wires of all widths.



E. A. CABBLE of the Wm. Cabble Excelsior Wire Mfg. Co. of Brooklyn, N. Y., and ALAN C. DUNHAM of Portland, Pacific Coast representative for Cabble fourdrinier wires.

AT LONGVIEW IT'S

- MIAMI AGI-FLO PUMPS
- MIAMI JORDANS
- MIAMI PRESSURE SEAL VALVES



Important feature of the new Longview installation is the pair of Miami Agi-Flo pumps for circulation and agitation of stock. (See above) Like other mills now operating Agi-Flo pumping equipment, Longview will get continuous agitation without stratification or dead areas, and uniform delivery of stock to machine regardless of stock level in chests.

Another feature is the battery of five Miami jordans (see right) which will feed stock to the new Longview No. 5 machine. Note the simplified piping and the conveniently controlled Miami pressure-seal valves. This is an engineered jordan installation at its finest.

Further details on this equipment may be found in the editorial sections of this issue. Additional facts may be obtained by contacting Mr. Robert Petrie, 3206 42nd Ave., Portland, Oregon.

SHARTLE BROTHERS • MIDDLETOWN, OHIO

Division of the Black-Clawson Co.

Paper Mill Men's Club Considers Incorporation

● Plans were launched at the February meeting of the Paper Mill Men's Club of Southern California to incorporate as a non-profit organization. Charles Spies, president of the group, presided. Chairman of the committee in charge of the meeting was C. O. "Chet" Gunther.

Frank Philbrook, first president of the club, read a report of the findings of the committee which had been appointed to investigate the matter of incorporation. Mr. Philbrook outlined the necessary procedure, the outline of a group of by-laws, and the main points indicated in such a set of by-laws.

The recommendation called for five directors to be the five past presidents, each year adding the junior past president to the board and dropping the oldest member to retain the number at five. A minimum dues of one dollar was suggested. Membership certificates will be drawn up and issued. And twenty per cent of the paid membership was proposed as a quorum.

The committee composed of Frank Philbrook, Edw. N. Smith, Neil Sinclair and George Weiman were scheduled to hold further deliberation on the final details of incorporation before the matter is placed before the membership for adoption.

The meeting at the San Gabriel Country Club, despite a torrential downpour (the storm that established a new 48-year record for the southland) was well attended. An excellent dinner was served, following which was the business meeting discussing the proposed incorporation, and after this the membership finished the evening in the customary indoor sports.

First-Aid Certificates Awarded To 140 Camas Employees

● Fred Pontin, Crown Zellerbach Corporation and Rayonier supervisor of safety instruction awarded company first-aid certificates to 140 men and women employees of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, at the Crown Willamette Inn, Camas, Washington, on February 20th. The presentation was a part of the company's safety and first-aid program, carried on under the U. S. Bureau of Mines specifications, in conjunction with a banquet for the participants.

Ed Sorger, state supervisor of industrial relations and safety, was speaker of the evening, declaring that the sponsors of the bill before the legislature, to abolish the merit ratings in state industrial insurance and medical aid, are misguided.

This bill would remove the advantage gained in lower cost of insurance to those companies sustaining good accident records; those companies paying more in premiums than are collected in claims.

Mr. Sorger says labor leaders who are pushing the bill have been led to believe that a system of state supervisors would take care of the accident problem, and added that the system would not work. Safety programs as are in effect in the Camas mill are what it takes to reduce accidents, according to the supervisor.

Instructors of the first-aid classes and memebrs of the first-aid team were introduced, including L. W. Bailie, J. B. Holmes, D. D. Hutchison, L. R. Mullineaux, H. A. Mason, G. Quilici, J. H. Rickard, Fred Weakley and E. W. White.

Three Boy Scouts, Judd Stewart, Melvin Baughman, and Allan Chappell, were awarded advanced company certificates. Junior Red Cross certificates were presented to a group of Camp Fire Girls, and A. M. Fisher, their instructor, was presented with his ninth consecutive Red Cross instructor's certificate.

Renew Medical Contract At Camas

● Crown Willamette Paper Company, Division of Crown Zellerbach Corporation and Camas Medical Service at Camas, Washington, entered into new full-coverage contract, taking effect March 1st, which is really a continuance of the contracts held over the past seven or eight years.

The Camas Medical Service is an organization among some of the Camas medical practitioners, with which all of the seven medical doctors cooperate, providing opportunity for the employees of the paper mill to obtain non-industrial medical coverage and hospitalization for a monthly fee. This organization also provides the company with industrial coverage, which was renewed the first of the year.

The medical service is a non-profit organization. Marginal receipts above costs apply to lowering the member fees or are applied toward the purchase of better medical facilities for the members.

Brinkley Now Representing Midwest-Fulton Equipment

● James Brinkley of the James Brinkley Company, Seattle, announces that his company was recently appointed Pacific Coast representative for the Midwest-Fulton Machine Company of Dayton, Ohio.

The Midwest-Fulton Machine Company manufactures the well known Fulton Dryer Drainage System for rapid condensate removal. More than 600 systems are in use, a large number being located on the Pacific Coast.

The company recently introduced a new Midwest Precision Beater which is said to be equivalent in beating capacity to four high speed beaters.

The James Brinkley Company is located at 417 Ninth Avenue South, Seattle. Associated with Mr. Brinkley in sales and engineering work is Douglas C. Morris.

Camas Mill Gives Rose Cuttings

● Late in February, Jack Hanny, resident manager of the Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington, announced that thousands of cuttings of the mill's Paul's Scarlet climbing roses will be given away to residents of Camas. This is another step, on the part of the paper mill, to beautify the city.

Head Gardener Louis Gfeller and his staff have since been kept busy pruning the 800 climbing rose bushes growing on the mill yard. It is estimated that every family in the community who can use them, will be provided with cuttings.

Mr. Gfeller has given instructions on the propogation of the rose cuttings to fit the local growing conditions.

Demand Embargo On Log Exports to Japan

● British Columbia members of the House of Commons at Ottawa are pressing for an investigation into the export of hemlock and balsam pulp logs to Japan in recent months and demanding that an embargo be placed on this trade.

Tom Reid, member for New Westminster, claims that British Columbia is being depleted of valuable raw material for pulp and paper mills of the future and Japan is being provided with the base of cellulose that might be used in manufacture of explosives. The fact that Japan is unfriendly to Canada and the British empire is given as an additional reason for immediate action.

A survey shows that Japan has been a heavy buyer of British Columbia hemlock logs in recent years. In 1940 Japan took delivery of 21 million feet; in 1939, 22 million feet; in 1938, 14 million feet; in 1937, 8 million feet; in 1936, 9 million feet, or more than 80 million feet in the past five years.

Japan also imported 5 million feet of balsam logs from British Columbia in 1940 and a similar amount in 1939. In 1938 imports by Japan were 1,250,000 feet, and in 1937, 750,000 feet; in 1936, 1,500,000 feet.

While it is possible that Japan pursued a policy of importing logs rather than pulp and paper because of the need for conserving exchange, the other assumption is that war demands influenced the heavy purchases in the last two or three years.

Douglas fir logs have been under strict embargo since June, 1940, as a war measure.

Most of the hemlock and balsam shipped from British Columbia to Japan recently originated on timber stands owned by the Port McNeil Trading Company, a subsidiary of Nippon Soda Company, backed by the Mitsubishi interests in Japan.

The pulp logs have been loaded direct onto Japanese freighters and transported across the Pacific, allegedly with metals purchased in the United States.

Gus Ostenson Guest Speaker at Longview

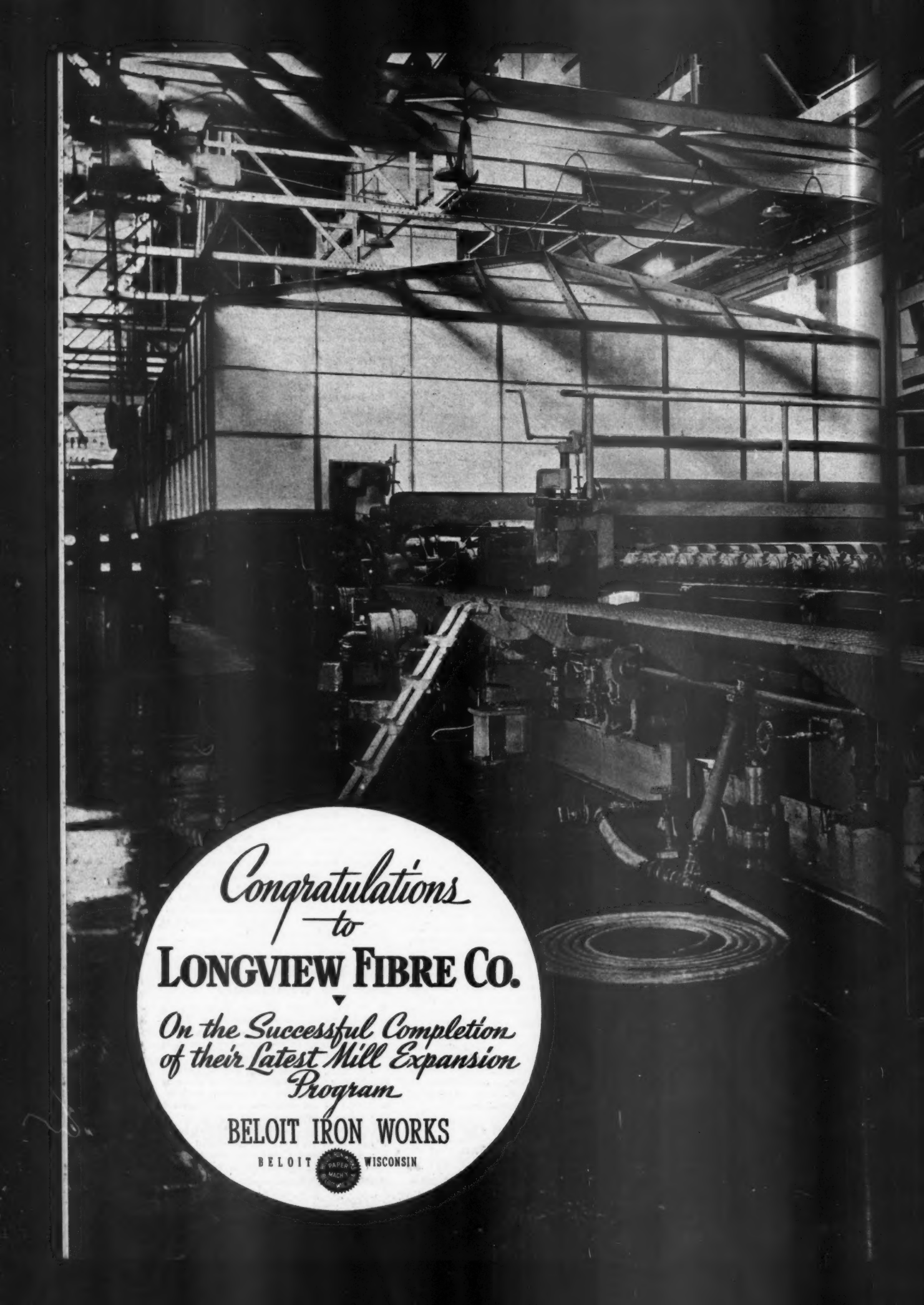
● Gus Ostenson, paper mill superintendent, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, at Camas, Washington, appeared before the pulp and paper class at the Longview vocational school February 25th, as guest instructor. His subject was "Paper Machine Operation." George H. McGregor, superintendent of Longview Mill, Pulp Division Weyerhaeuser Timber Company, is head of the pulp and paper course.

Talk Metal Plant For New Westminster

● M. H. Newell, of San Francisco, is applying to the New Westminster, B. C., city council, for a site on which to locate a new industry to manufacture zinc dust for use in west coast paper mills.

The firm, to operate as British Columbia Metals, Ltd., would proceed at once with the erection of a building and installation of an oil-burning zinc furnace and other equipment.

The zinc presumably would originate at the Trail plant of Consolidated Mining & Smelting Company, which ships through Pacific Terminals at New Westminster.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LONGVIEW FIBRE CO.
On the Successful Completion
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BELOIT IRON WORKS
BELOIT WISCONSIN
PAPER MACH'Y

I'm no hot shot, *honest...*

Every once in a while I'm dubbed "a lubrication hot shot," and I'm not one, honest. Now if they'd call me "a good salesman for Safety Factors," that would be more like it. For instance:

The other day, I fixed up a traveling kiln that had been freezin' bearings pretty bad. Yet all I did was suggest a bearing lubricant nobody else had been able to supply those folks.

So what? So I get the credit, when actually it's one of the Shell Safety Factors that did it. Shell has a whole bagful of these money-saving Safety Factors that I'd like to talk to you about. Just say when . . .

Your Shell Salesman

Some Observations Regarding Chlorination of Sulphite Pulp

by N. W. COSTER* and R. I. THIEME**

Abstract

Data is presented for the chlorination of unbleached western hemlock sulphite pulp at temperatures of 5, 15 and 30 degrees C. and chlorine additions of 35%, 50% and 65% of demand. Comparative data for three bleaching methods of chlorination, i. e., using gas, hypochlorous acid, and a combination of gas and calcium hypochlorite, are given.

Based on data taken in the mill, calculations are made showing that when neutralizing washed chlorinated pulp with caustic soda, an amount of organic material is dissolved equal to more than 10% of the amount dissolved in the original chlorination.

Introduction

● What takes place when elementary chlorine as gas or chlorine water reacts with the lignin or lignosulfonic complex of an unbleached sulphite pulp? We might just as well admit that we do not exactly know, since we know neither the exact structure of the lignin molecule nor the exact part of it that reacts with the chlorine. The presence of certain characteristic groups in the lignin structure is generally accepted, and it is upon the basis of these known groups that the theories of chlorination are founded.

Under conditions where elemental chlorine is the active agent there are several possibilities as to the nature of the reaction involved. The reactions which result in the formation of the soluble lignin compounds will fall into two classes, namely, substitution and addition.

Indications point to the fact that the majority of the reaction is one of substitution, although there is considerable difference of opinion on this matter in the literature ([1,2,3,] and others). Judging from the amounts of hydrochloric acid produced, that we have found when chlorinating pulp, a reaction of substitution must predominate, although it cannot be shown that it exists alone. The principal consideration regarding these two types of reactions is their end products. In the case of substitution, hydrochloric acid is produced in an amount exactly equal to one half the chlorine added (This is also true in the case of oxidation, hydrochloric acid being produced in an amount equal to the chlorine added). In the case of addition, all of the chlorine is taken up by the lignin and no hydrochloric acid is produced.

The precise manner in which these reactions occur is not known. The addition reaction most certainly involves the unsaturated portions of the lignin molecule. On the other hand, the substitution reactions may involve the methoxyl groups, hydroxyl groups, or the aromatic nucleus of the molecule. Brauns[4] indicates the presence of an extremely reactive hydroxl group which is of controlling importance in the chlorination reaction. Additional investigation along this line will no doubt give much valuable information.

Effect of pH

● A consideration of the fundamental reaction between chlorine and water shows the following:

Eq.(1)

$$Cl_2 + H_2O \rightleftarrows HOCl + HCl$$

$$\downarrow\uparrow \qquad \downarrow\uparrow$$

$$OCl^- + H^+ \qquad H^+ + Cl^-$$

Below a pH of 2.0 elementary chlorine is present substantially alone. From pH 2.0 to 5.0 the amount of hypochlorous acid increases until it is present 100% at a pH of approximately 5.0. From this point upward the concentration of hypochlorite ion becomes greater until at pH 9 and above, it predominates ([1,2,5,6]).

The hypochlorite ion of course cannot be considered a factor in chlorination as its reaction is of an oxidizing nature, and we have therefore to limit our field of chlorination reactions to a pH of 5.0 or less.

Hypochlorous acid, prepared in one way or another, has been used for a number of years by several mills as chlorinating agent, and it might be of interest to compare the effect that chlorination with these two reagents has upon pulp quality as measured by certain physical and chemical tests. For this comparison we list in Table I the results obtained when treating the same kind of pulp in three different ways:

A. With elemental chlorine. (Chlorine Gas)

B. With hypochlorous acid made from chlorine, water and limestone.

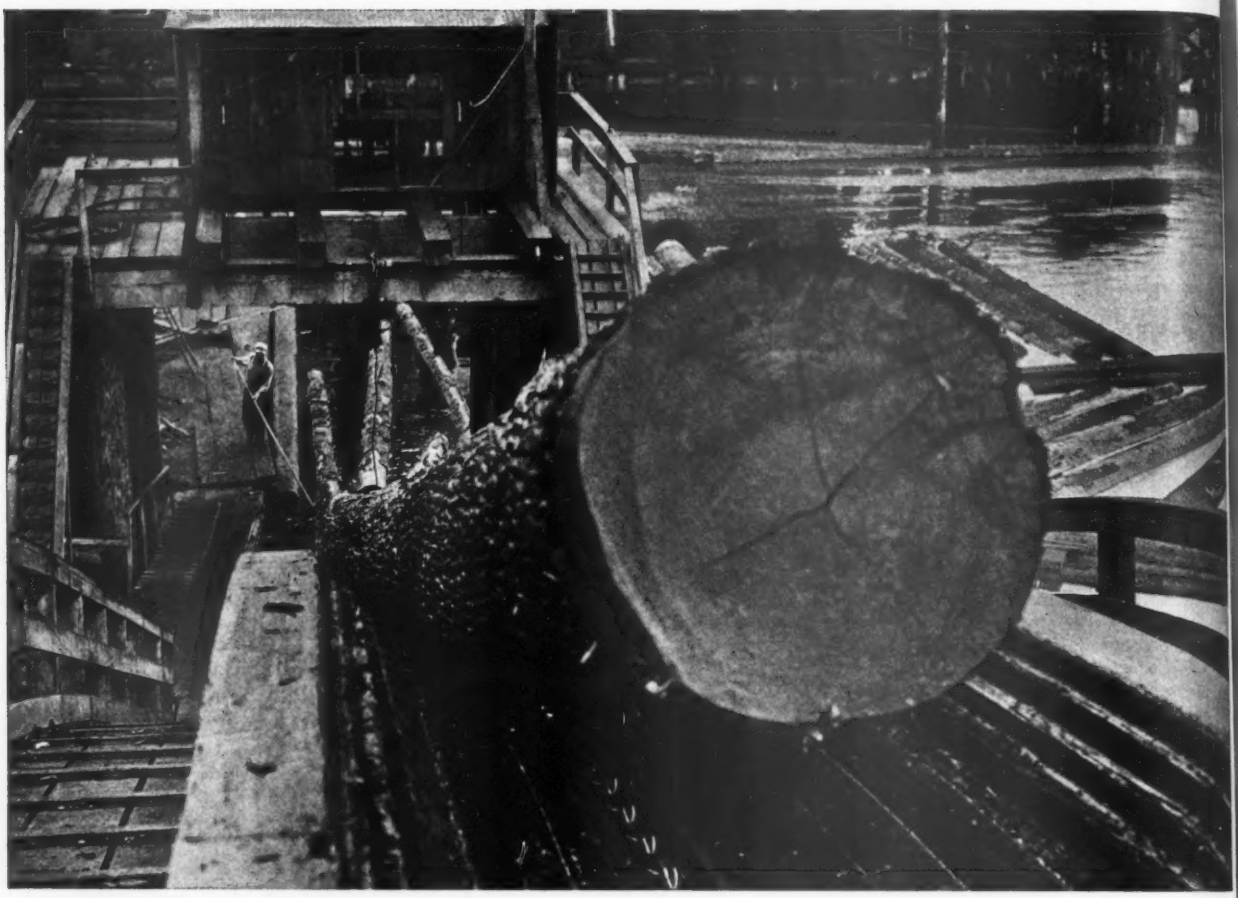
C. With hypochlorous acid in "its state of liberation," a patented process.[7]. This is produced by first adding a small amount of chlorine gas to the pulp suspension and after the chlorine has been exhausted, calcium hypochlorite solution is introduced at such a rate of flow that the hydrochloric acid formed by the reaction between the lignin and the chlorine gas breaks the hypochlorite down immediately into hypochlorous acid. In other words, the pH is at all times 5.0 or less, and we have hypochlorous acid in its state of liberation as the reagent that brings the lignin into solution. Under these conditions the hypochlorite ion does not act as an oxidizing agent but in a manner similar to elemental chlorine. That is, the reaction appears to be largely substitution and addition. Referring to Figue I Method C, after 45 minutes, although there is a decrease in pH it is not sufficient to account for an oxidizing reaction. It is believed that if the reaction had been one of oxidization alone the resultant pH would have approached that of chlorination with gas alone.

The pH of the pulp suspensions and the chlorine exhaustion rates of the three different procedures are to be found in Figures 1 and 2 respectively. Some of the other data from chlorination by these three different methods and some tests on the chlorinated pulps are shown in Table I.

An examination of these data shows that the reaction is the fastest when using chlorine gas, and the pulp produced has the lowest bleachability. The chemical and physical tests on the chlorinated pulp indicate that slightly stronger pulp is obtained when using chlorine gas than when using hypochlorous acid. However, the differences shown are so small that they lie within the ex-

*Member of TAPPI, Technical Director, Soundview Pulp Company, Everett, Washington.

**Chemical Engineer, Soundview Pulp Company, Everett, Washington. Presented by Mr. Coster at the Symposium of Chlorination of Wood Pulps, Annual Meeting of TAPPI, Hotel Roosevelt, New York City, February 17-20th, 1941.



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perimental error, and therefore do little more than show a trend.

Of the two hypochlorous acid methods (B and C), Method C, using the same in "its state of liberation" is to be preferred because it not only produces the best pulp but also works at a pH where no special precautions for acid resistance have to be taken. It has been used for a number of years with great success in a mill where the chlorinating cells were lined with ordinary tile and no special arrangements were made to protect metal parts(as agitators, shafts, valves, etc.) coming into contact with the chlorinated pulp.

Effect of Consistency

● The experimental chlorinations referred to in this paper have all been carried out at a consistency of 3% for convenience. The mill operations referred to are conducted at a consistency of 3% to 4%. It is necessary that the chlorine and the pulp be brought rapidly into contact with each other, and this cannot be done in mill operations, with the equipment available at present, at much higher consistencies than those mentioned above. Therefore we have not presented any data for the effect of consistency, especially since it has already been proved that chlorination over a wide range of consistencies has no effect on the pulp produced[3].

Effect of Time

● Time as a factor in batch chlorination is shown in the tabulated data (Table II) concerning chlorine exhaustion. Thirty minutes represents the gas introduction period, and was chosen to simulate actual operating conditions. We find that in mill practice the period of introduction will vary from 20 to 30 minutes depending upon the amounts of chlorine involved. However, 30 minutes represents a reasonable time.

It is significant to note the high percentages of chlorine consumption during the period of addition. This substantially checks the work of other investigators[5], although a direct comparison is probably not possible. The most efficient time for chlorination treatment is dependent on several factors. Practical considerations of pulp production make prolonged chlorination periods unfeasible. In plant operation a time (total) of 45 to 60 minutes is the most suitable one. This allows for the exhaustion of 90% to 95% of the chlorine even at fairly high chlorine concentrations, and yet does

TABLE I

Comparison of Chlorination Treatments

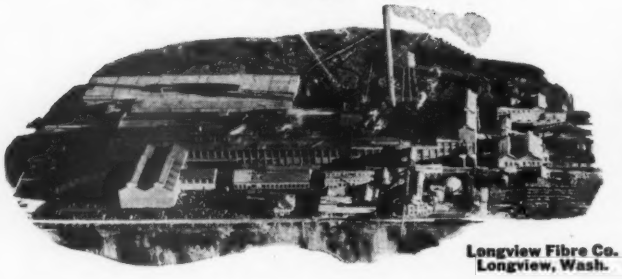
		Method A	Method B	Method C
Chlorine added, lbs./ton pulp		68	68	68
Chlorine absorbed, lbs./ton pulp		62	57	59
Temperature of pulp suspension, °C.		14-15	14-15	15-16
Chlorinating time, minutes		90	90	90
Pulp consistency, % A. D.		3.0	3.0	3.0
Caustic used for neutralizing, lbs./ton pulp		65	27	10
pH at end of chlorination		1.7	2.4	3.9
pH at end of neutralization		7.1	7.2	7.4
Tests on Chlorinated Pulp				
Brightness, G. E.		61.7	57.2	64.8
Bleachability, % Cl_2		0.4	0.6	0.5
Cuprammonium Viscosity, C.P.		83	81	75
1% NaOH solubility, %		13.6	14.0	15.2
Mullen	5 minutes beating	42	38	39
	35 minutes beating	82	81	78
	65 minutes beating	102	99	96
Tear	5 minutes beating	227	221	248
	35 minutes beating	164	174	168
	65 minutes beating	147	154	138
Freeness	5 minutes beating	880	880	870
	35 minutes beating	810	820	800
	65 minutes beating	630	700	620

TABLE II

Treatment of Unbleached Sulphite Pulp With Elemental Chlorine Under Various Conditions

Batch number	1	2	3	4	5	6	7	8	9
Cl_2 used (% of total)	35	50	65	35	50	65	35	50	65
Temperature, °C.	5	5	5	15	15	15	30	30	30
Consist., % A.D.	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
% Exhaustion									
30 minutes	92.7	85.4	77.3	92.7	85.2	80.7	92.4	90.6	85.9
45 minutes	92.7	88.9	81.2	93.3	89.7	82.3	93.2	92.4	92.8
60 minutes	92.7	90.5	83.7	93.8	91.6	87.1	94.7	93.5	95.9
75 minutes	92.7	92.4	84.5	93.8	92.4	88.3	95.2	94.1	97.1
90 minutes	93.3	92.9	86.3	94.6	93.5	90.7	95.5	95.3	97.4
pH									
15 minutes	2.2	1.9	1.9	2.7	2.1	2.3	2.4	2.1	2.0
30 minutes	2.1	1.9	1.9	2.1	1.8	1.9	2.1	1.9	1.9
45 minutes	2.1	1.9	1.9	....	1.7	....	2.1	1.9	1.9
60 minutes	2.1	1.9	1.9	1.9	1.7	1.8	2.1	1.9	1.8
75 minutes	2.0	1.9	1.9	1.9	1.8	1.8	2.1	1.9	1.8
90 minutes	2.0	1.9	1.8	1.9	1.8	1.6	2.1	1.9	1.8
Mullen									
5 min. beating	37	36	41	41	42	40	37	38	40
35 min. beating	78	80	84	87	85	82	82	85	85
65 min. beating	95	99	100	100	100	102	105	103	103
Tear									
5 min. beating	269	272	258	229	216	227	234	246	258
35 min. beating	187	181	163	171	174	164	169	178	178
65 min. beating	160	152	149	156	144	147	144	157	148
Freeness									
5 min. beating	870	870	870	870	870	870	870	870	870
35 min. beating	810	810	800	790	810	810	790	810	810
65 min. beating	640	620	630	600	610	630	550	600	600
Brightness, G. E.	48.3	55.8	60.5	43.9	56.1	61.7	48.2	56.1	59.3
Bleachability, % Cl_2	1.5	0.7	0.5	1.5	0.7	0.4	1.5	0.7	0.4
Viscosity, C.P.	104	94	88	109	99	83	108	99	75

At Longview



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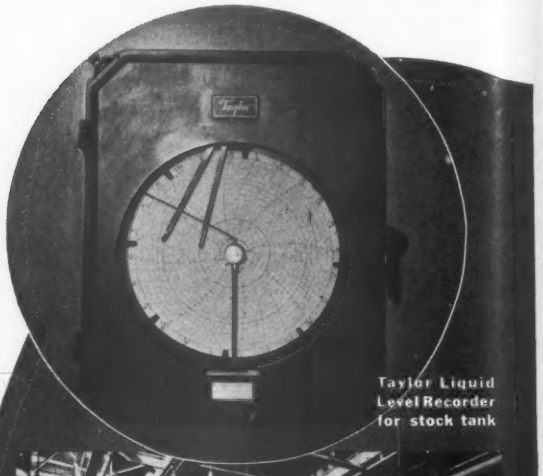
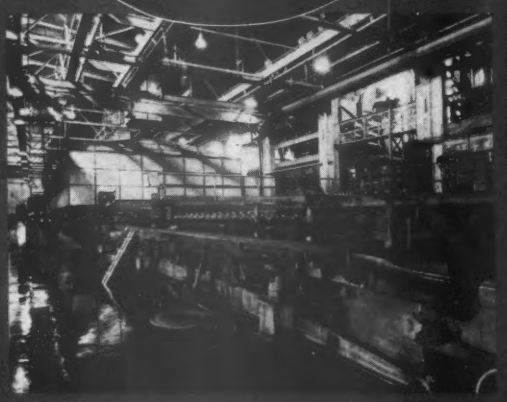


Taylor Liquid Level Recorder for stock tank



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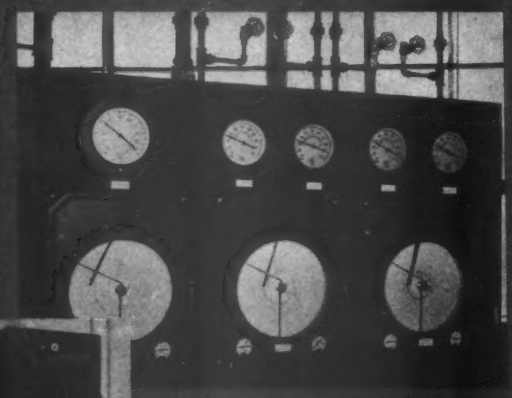
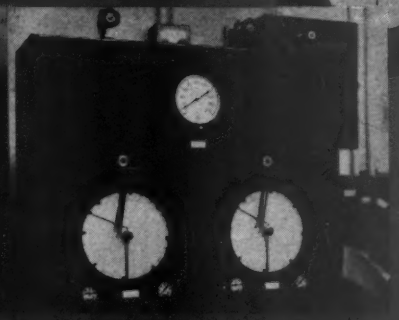


Three Taylor Fulscope Controllers (recording differential pressure type) on panel of new No. 5 paper machine maintain constant steam differential



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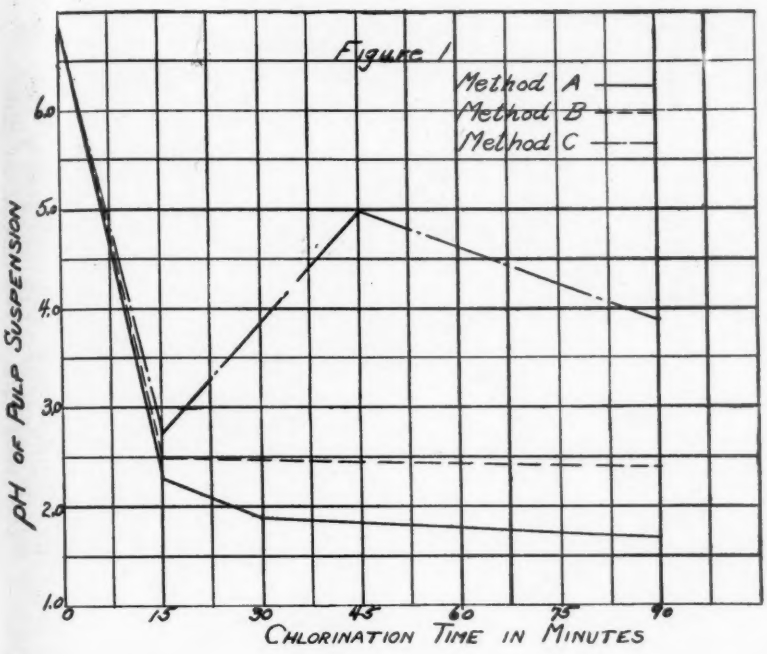


not necessitate extensive equipment. Since there is a strong possibility that during the latter part of the chlorination a large part of the reaction involves the already dissolved chlorinated products, little benefit can be derived from allowing extra time for complete chlorine exhaustion.

Effect of Temperature

● Referring to Table II it will be noticed that the chlorination experiments were made at temperatures of 5, 15 and 30 degrees C. An inspection of these results reveals that the effect of temperature is as follows:

A. Chlorine exhaustion is more complete at higher temperatures, although the effect is not pronounced with an addition of 50% of demand or less.

B. The pH conditions are unaffected. The variations shown fall within the experimental errors of determination.

C. The physical properties of the pulp are not greatly affected by temperature variation.

D. Viscosity is the only chemical property of the pulp which shows a decided trend with chlorination temperature. Values decrease with an increase in temperature at the higher chlorine concentration, showing that the higher temperatures cause some attack on the cellulose. Since other features of the pulp manufacturing process have a greater effect on the physical properties than chlorination temperature, it is impossible to show any variations from this source on a plant scale.

Naturally bleach plant operations in the mill will not be subject to the variables in temperature used in these experiments, however, excluding bleachability it is our biggest single variable. The following data is the result of a large number of determinations showing the effect of winter and summer conditions upon chlorine exhaustion rate:

Temperature	Bleachability	% Exhaustion (45 min.)
50° F.	4.70	92.0
70° F.	4.90	92.8

It is to be seen that there is practically no change in conditions due to temperature, and as previously mentioned, the effects are of such small magnitude that they are overshadowed by more important variables in the pulp making process. The minimum temperature at 50° F. for winter conditions was maintained by the use of steam, and our operating data indicate that it should not be much lower. Numerous tests made over a period of years in our bleach plant show an excellent correlation between experimental results and full scale operations. Average per cent exhaustions for comparable chlorination periods check within 5%.

Effect of Chlorine Concentration

● Chlorine concentration is the controlling variable in the chlorination process. Values found for additions of 35%, 50% and 65% of the chlorine demand of the pulp show particularly wide variations in bleachability, brightness and viscosity. It is of particular interest to note that the strength properties are but little affected by these wide variations in chlorine addition. One of the early objections to the use of elemental chlorine lay in the belief that the high concentrations of hydrochloric acid produced would cause a degradation of the fibers. We can see here that this idea is wrong, as has previously been shown by other investigators ([8,2] and others).

The question, "How far to chlorinate," is one very often asked and of considerable importance. Perhaps the best answer is to say "As much as possible." This is limited by several factors such as size of equipment available, chlorine economy desired, kind of pulp to be treated and others. However, our experience has been that the chlorinated pulp should have a constant chlorine demand regardless of the bleachability of the unbleached pulp from which it is made. Also, in the subsequent bleaching treatment, not more than 15 pounds of chlorine per ton of pulp should be used to obtain the desired brightness.

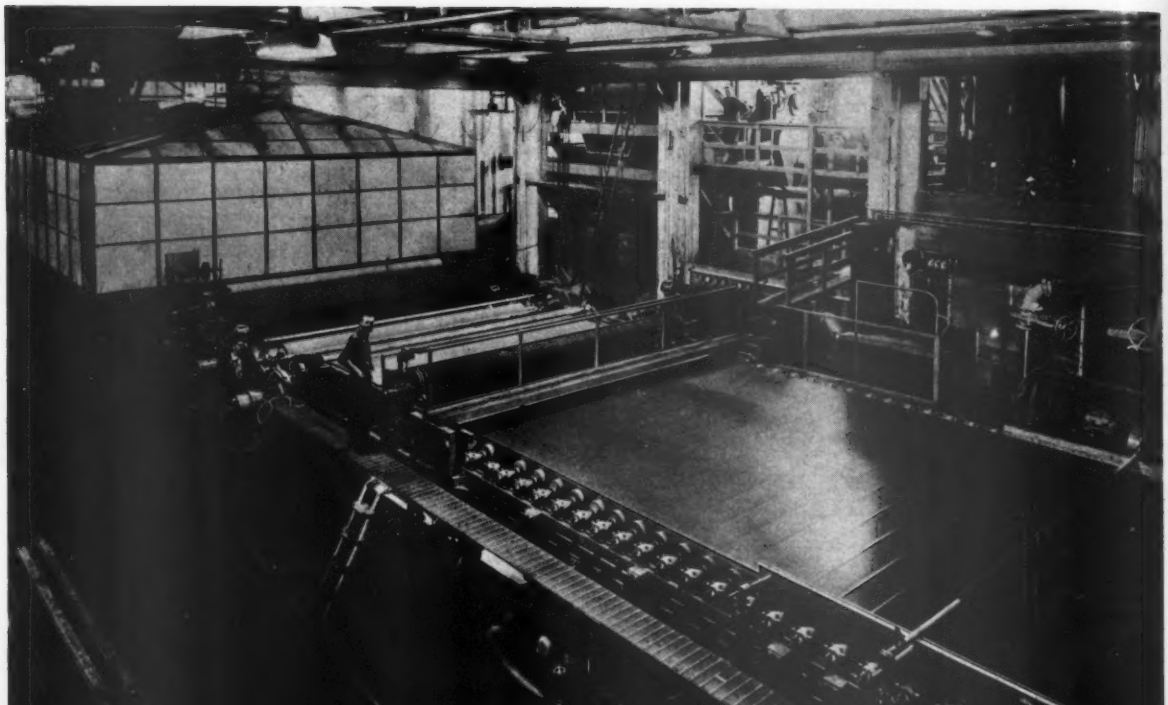
The Dissolving of Organic Material During Chlorination

● As a rule the rate of chlorination is guided by the amount of excess chlorine at the end of the chlorination period, and the bleachability of

TABLE III

Dissolving of Organic Material in Commercial Batch Chlorination

Bleachability of unbleached pulp, % Cl_2	3.5	4.9	5.3	6.3
Temperature of pulp suspension, °F.	68	70	69	65
Organic Number:				
After 15 minutes chlorination	1.13	2.03	2.16	1.89
After 30 minutes chlorination	1.39	2.22	2.45	2.71
After 45 minutes chlorination	1.47	2.31	2.54	2.82
Ratio: Organic number after 45 minutes / Chlorine number of unbleached pulp	0.42	0.47	0.48	0.45
Bleachability of chlorinated pulp	0.72	0.77	0.72	0.72



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the chlorinated pulp. Another means for guidance would be to determine the organic material brought into solution during the chlorination process. For this purpose, by using a modification of the methods of Prelinger and Triplett ([9,11]), we have followed the amount of organic material brought into solution during the chlorination of unbleached Sulphite pulp over a wide variation in bleachability. The amount of organic material brought into solution is represented by the "Organic Number." This is defined as the number of cc of 0.125 N. Potassium Iodate consumed by 2 cc of fiber free liquid drained from the pulp.

The results obtained are shown in Table III. It is of interest to note that the relation "Final Organic Number" divided by "Chlorine Number of the Unbleached Pulp" is practically constant. This is as it should be, since all of the pulps are chlorinated to a constant bleachability.

From these results it can be seen that very little dissolving action takes place after 30 minutes of chlorination. Also the ratio of increase in organic material does not conform to the ratio of increased chlorine usage during the same period, being smaller. This indicates that an appreciable part of the reaction involves the dissolved organic matter. However, the increase in organic material, although small, is of definite value and represents the action of the small amount of residual chlorine present during this portion of the chlorination.

Washing of Chlorinated Pulp

● Before the equipment manufacturers were able to furnish the industry with washers made from material able to withstand and resist the hydrochloric acid and residual chlorine present in chlorinated pulp, it was necessary to add sufficient alkali to the pulp suspension to produce a pH of at least 7.0. Due to the large amounts of alkali needed for this recation it was necessary to use a fairly inexpensive material in order to keep the cost down. As a result, about the only material available was calcium hydroxide. Phelps and Schuber[2] and others have shown that lime together with chlorinated lignin form an insoluble compound that is precipitated on the pulp fibers and cannot be fully removed during further bleaching procedure. Experience from plant operations has proven to us that if lime is used for neutralizing the chlorinated pulp, color reversion of the fully bleached pulp during long time storage is greater than if sodium hydroxide is used for the same purpose. However, now that the industry has washers available made from acid resisting materials, it is not necessary to neutralize the chlorinated pulp before washing.

No matter how efficiently the chlorination has taken place, it will be of little avail if the chlorination products are not properly removed in the subsequent washing. To do so, it is not only necessary to dilute the chlorinated pulp with white water, which is as pure as practical operations will allow, and run the washer at such speed that a uniform sheet, free from lumps is formed, but also to allow the sheet enough time under the showers to give ample time for dispersion.

Unfortunately we have not as yet any efficient testing method by which we can accurately guide our washing operations. The older method of determining the washing efficiency from the chloride content of the feed and cake of a washer is not satisfactory as it doesn't tell anything about the amount of organic material (Chlorinated lignin products) removed in the washing and, after all, that is what we aim to do. Methods like that of Prelinger[9], although not entirely satisfactory, are undoubtedly a step in the right direction. Further investigations along these lines will no doubt be very helpful and it is hoped that they will eventually bring forth a method suitable for mill control that will give us a better picture of our washing operations.

We list below some figures showing the effect that the pulp consistency of washer feed has upon washing efficiency according to the two methods mentioned above:

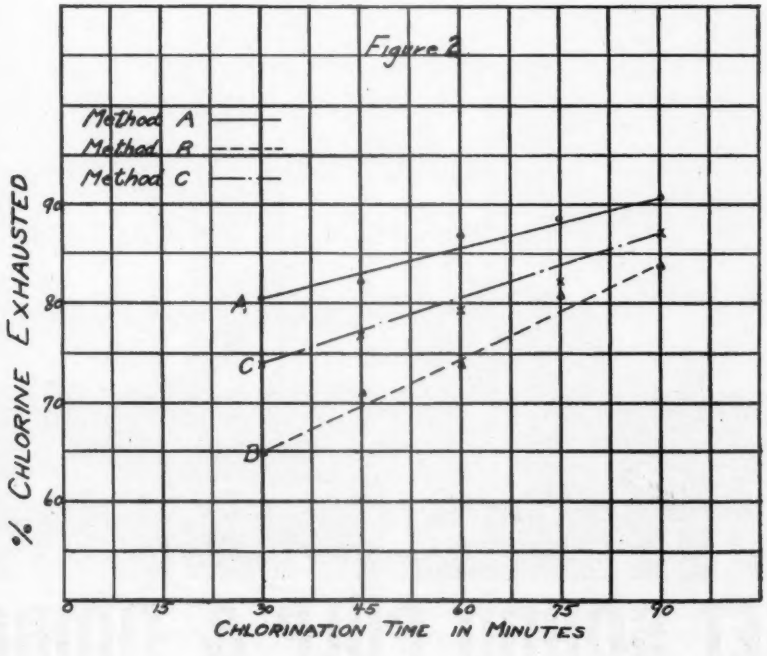
Consistency of Pulp in Vat Per Cent B.D.	Per Cent Washing Efficiency: Prelinger Method	Per Cent Washing Efficiency: Calcium Chloride Method
2.0	84.3	88.1
1.6	91.2	94.7
1.4	94.7	97.8

These tests were made at constant washer speed and with the same amount of pulp going over the washer. In other words, the only factor changed was the amount of dilution water used.

Neutralizing the Washed Chlorinated Pulp

● Even with the most efficient washing it is impossible to remove the last traces of hydrochloric acid and residual chlorine from the chlorinated pulp. Inasmuch as it is necessary to have the subsequent treatment with hypochlorite take place under alkaline conditions it is desirable to neutralize the chlorinated pulp before the hypochlorite is added to it. It is furthermore generally accepted in the literature[2] that a portion of the chlorinated lignin material is not brought into solution under acid conditions, and that this material can be either dissolved or dispersed by alkaline treatment[7].

This neutralization can, of course, take place in the same vessel in



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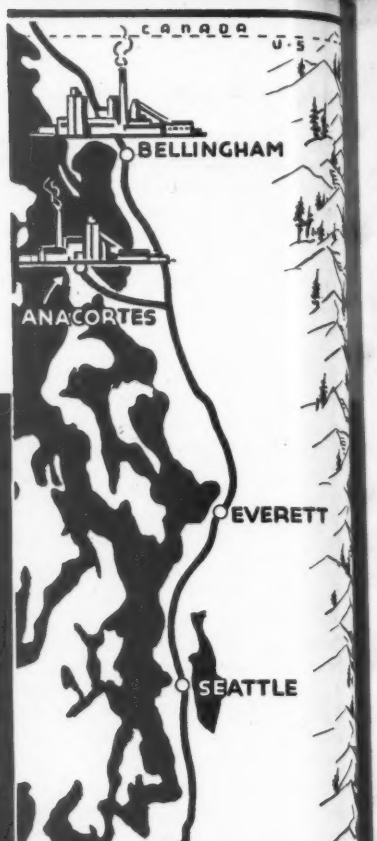

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which the hypochlorite bleaching occurs but, if so, it will be done before the hypochlorite has been added. However, as the hypochlorite would react with these compounds and use up chlorine, it is better to remove them before the hypochlorite bleaching takes place.

By adding a small amount of sodium hydroxide to the chlorinated pulp as it leaves the washer, enough to raise the pH of the pulp suspension to 9.0, and then leaving it in an agitated chest for approximately one half hour, good results have been obtained.

In order to determine the effectiveness of this treatment we conducted a series of experiments making use of a modification of the fundamental method of Prelinger and Triplett ([10,11]). By this method a value can be found which represents the amount of organic material present in a solution. Taking samples before and after the neutralizing treatment and evaluating the dilution water, it is possible to measure the increase in organic material present. The data represents the average of three complete determinations:

	Chlorinated Washer Cake	Stock After Caustic Treatment	Dilution Water
Consistency, B.D.	8.44	2.62	
Lbs. water/Lbs. B.D. pulp	10.85	37.16	25.31
Organic Number*	0.441	0.413	0.031

Evaluated to determine values for stock entering the neutralizing treatment:

(26.31) (0.031) = 0.82	5.61/37.16 = 0.151	Organic Number of stock entering neutralizing treatment.
(10.85) (0.441) = 4.79	0.413	Organic Number of stock leaving neutralizing treatment.
5.61	0.262	Difference

Since the consistency is unchanged: (100 (0.262)/(0.151) = 174% Increase in Organic Number (The amount of organic material in solution is almost tripled).

Using a consistency of 3.15% B.D. for the chlorination, at a bleachability of 5%, the Organic Number at dump time is 2.40 (Experimentally determined). Then (100) (2.40)/(3.15) (1.031 = 73.8 Evaluated Organic Matter ** in stock entering chlorinated pulp washer.

In the cake from the chlorinated washer:
(100) (0.441)/(8.44) (1.046 = 5.01 Evaluated Organic Matter in cake leaving washer.
(5.01) (1.74) = 8.66 Evaluated Organic Matter dissolved in neutralizing treatment.
(100) (8.66)/(73.8)=11.7% Amount of Organic material dissolved in the neutralizing treatment as compared to the amount dissolved in the chlorination.

Other determinations indicate that these data may be for optimum conditions, however, an average value of approximately 10% will hold. The value of this treatment is quite apparent from a consideration of these figures.

No provision is made for temperature control. The temperature at which the neutralizing treatment is made depends upon the temperature of the washer cake and dilution water. The results shown are derived from data taken at a median temperature of approximately 55° F. Year around mill operation will show a maximum temperature variation of approximately 45-70° F. Whether temperature control would result in a sufficient improvement to justify the added cost is a matter for additional investigation.

It would logically follow that if we can show such a definite increase in dissolved organic material during the neutralizing treatment, then the same effect should be reflected in the bleachability. With this in mind several tests have been made on samples taken in the mill and they showed a very definite decrease in bleachability due to the neutralizing treatment. Average value obtained from tests on the same equipment used for the organic matter determinations indicated a decrease in chlorine number of approximately 0.25% (TAPPI). This represents about 5 lbs. of chlorine per ton of pulp, and on this score alone justifies the use of the more expensive sodium hydroxide as a neutralizing agent.

*Organic Number is defined as the number of cc of N/8 KIO_3 consumed by the organic material in 2 cc of liquid.

**An arbitrary expression that takes the consistency of the pulp mixture into consideration, thus allowing for the comparison of the amount of organic material in solutions taken from pulp mixtures of different consistencies. Evaluated Organic Matter = (Org. No.) (100)/(B.D. Consist.) $\left(\frac{100}{100 - \text{B.D. Consist.}}\right)$

General Conclusions

1. Experimental chlorination results are correlated quite closely in full scale operation. The same can be said of operations using hypochlorous acid.

A. At least 75% of the total chlorine consumption is used up during the period of introduction.

B. Approximately 90-94% of the available chlorine provided for the pulp is consumed in a 45-minute period.

C. Final chlorination pH values are in the range 1.5-2.0.

2. Mill operations call for the use of acid resistant equipment, both for chlorination and washing.

3. A neutralizing treatment of washed chlorinated pulp provides a valuable means for the removal of additional organic materials undissolved in the chlorination. An amount equal to more than 10% of the organic material dissolved in the chlorination treatment can be removed in this fashion.

Notes on Experimental Bleaching

• The pulp used was a strong bleachable sulphite pulp made from Western Hemlock having a bleachability of 5.24% Cl_2 according to TAPPI Standard T-214. At all times the amount of pulp used was 5100 grams, and the pulp consistency 3% A. D. The chlorinating vessel and apparatus for measuring the amount of liquid chlorine required are shown in Figure 3.

Notes on Testing Methods

Beater Processing—According to TAPPI Standard T-200.

Forming and Testing of Pulp Sheets—Modification of TAPPI Standard T-205.

Principal modification: Sheets are formed on an 8x8 sheet mould and dried in a current of warm air. The sheet weight is 50 lbs. Mullen expressed as lbs./lbs.x100, and Tear as Grs./lbs.x100.

Viscosity—According to TAPPI Standard T-206.

1% NaOH Solubility—According to TAPPI Standard T-212.

Modification: A 250 cc Erlenmeyer flask with an air condenser is used in place of the 200 cc tall form beaker.

Bleachability—According to TAPPI Standard T-214.

Unbleached Pulp 25 cc 0.1 N. $KMnO_4$.

Chlorinated Pulp 10 cc 0.1 N. $KMnO_4$.

Residual Chlorine—Meta Bisulphite Method. (Pacific Pulp & Paper Industry, January, 1939)

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Experience is, after all, the most useful thing a manufacturer of a machine has to offer. It is the most valuable item that a buyer can buy. Experience provides the assurance that the machine will be built right and will work right.

Filters for pulp and paper mills are no exception. In fact, considering the importance of their functioning, experience on the part of the manufacturer is the first thing the buyer should check. It should be rechecked as the last thing. It is a value to him that cannot possibly appear in the price of the filter but is definitely worth paying for.

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Now that time is an important factor, safeguard every hour of production by making it an "experienced" filter.

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33 West 42nd St.

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2900 Glascock St.

Factories: Hazleton, Pa. — Oakland, Calif. — Orillia, Ont., Canada

Organic Number—Refer to literature reference[10]. Determined as follows:

Using a large test tube (25 mm), add 2 cc of $KIO_3.H_2SO_4$ reagent to an amount of sample (1-20 cc) which will not reduce all of the KIO_3 present. Three glass beads are used in each tube. Tubes are placed in a wax bath and kept at a temperature of 120-140° C. until most of the water is evaporated, then heated to 170° C. The tubes are kept at this temperature until a clear solution results. Remove, cool and add 5-10 cc of distilled water rinsing the sides of the tubes. Replace in the wax bath and hold at 120-130° C. until the solution is again clear. Remove, cool, and titrate. Two cc of 5% $NaHCO_3$ and 5 cc of 15% KI are added and the liberated Iodine titrated with N/8 Sodium thiosulphate. Starch is used and thiosulphate is titrated from a micro burette. Usually two blanks are run with each determination.

Solutions: $KIO_3.H_2SO_4$ reagent. 0.25N KIO_3, 400 cc Conc H_2SO_4/liter 0.125N $Na_2S_2O_3$, 15% KI, 5% $NaHCO_3$.

Acknowledgment

● The authors wish to express their appreciation to the management of the Soundview Pulp Company for permission to publish this paper.

Literature Cited

[1] Rue, J. D., Trans. Electrochem, Sec. 73 137-49 (1938).
[2] Phelps and Schuber, Paper Trade J. 106 No. 8:126-128 (Feb. 24, 1938).
[3] Kress and Voightman, Paper Trade J. 97 No. 7:29-44 (Aug. 17, 1933).
[4] Brauns, F. E., Paper Trade J. 103 No. 6:36-39 (July 30, 1936).
[5] Carmody and Mears, Paper Trade J. 106 No. 20:38-44 (May 19, 1938).
[6] Hisey and Koon, Tech. Assoc. Papers 19:293-300 (June, 1936).
[7] Coster, N. W., U. S. Patent 2,195,396 Can. Pat. 387,836.
[8] Jackson and Parsons, Paper Trade J. 108 No. 20:50-56 (May 18, 1939).
[9] Prelinger, H., Paper Trade J. 107 No. 11:81-86 (Sept. 15, 1938).
[10] Prelinger, H., Paper Trade J. 109 No. 10:35-40 (Sept. 7, 1939).
[11] Triplett, C., Pacific Pulp & Paper Industry, 14 No. 3 (March, 1940).

Du Pont's Iowa Cellophane Plant Starts

● The first "Cellophane" cellulose film made in the Midwest rolled from the Du Pont Company's new Clinton, Iowa, plant on March 3rd, according to an announcement by the management.

Some 200 employes began work on that date. An additional 300, almost all Midwesterners with no previous experience in the chemical industry, are expected to be employed and trained in their new jobs before the end of August.

Food industries of the Middle West, it was said, will receive the first shipments of new film and thereafter consume the largest share of the Clinton output.

Officials emphasized that the plant is a commercial operation exclusively and incapable of being converted to "any purposes other than that for which it was originally designed, namely, the manufacture of 'Cellophane' cellulose film."

This is the fourth "Cellophane" plant built in America since Du Pont's large-scale introduction of the film here from France in 1924. The price was then $2.65 a pound and the sparkling wrapping made from chemically transformed spruce and Western hemlock trees was little more than a scientific curiosity. A better film of the same type now is sold for 33 cents a pound, while moisture-proof varieties sell for 41 cents a pound.

The Clinton operation, officials said, is the first situated west of the Mississippi and also the first that is completely disassociated from the manufacture of viscose rayon, a companion cellulose product.

Crown Zellerbach Reduces Debt Another Million

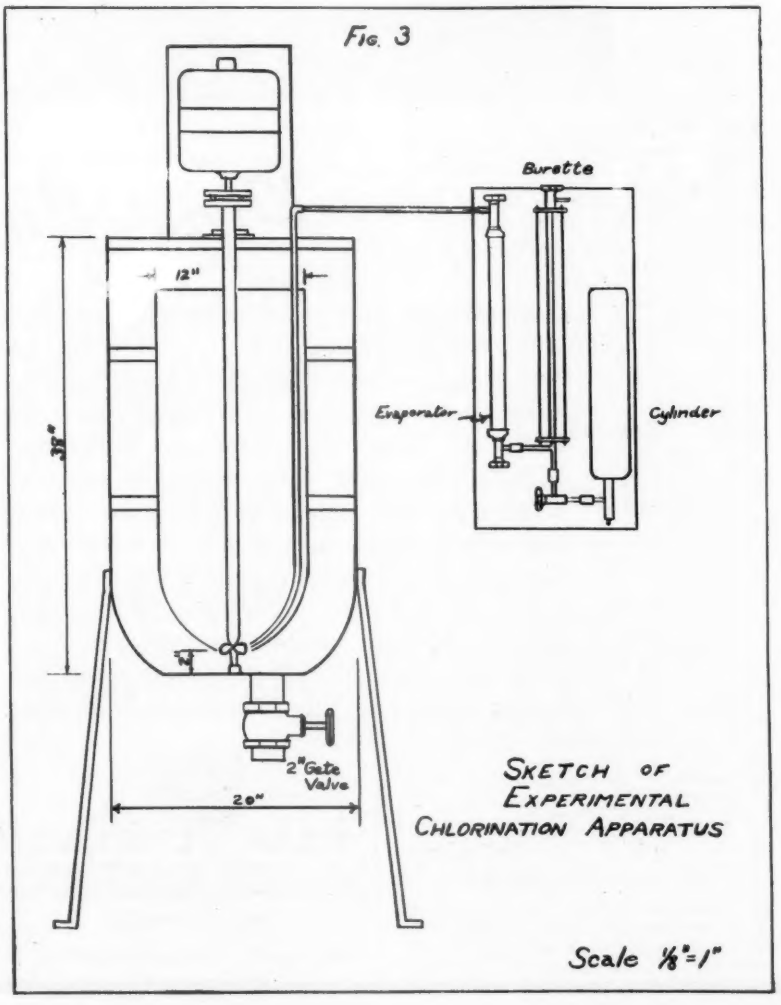
● On February 19th the Crown Zellerbach Corporation announced it had reduced its bank loans by another $1,000,000. Loans from banks, which at the end of the last fiscal year, April 30, 1940, had totaled $13,800,000, were cut to $9,000,000 by this latest payment.

Desert Chemical Now Shipping Sodium Sulphate

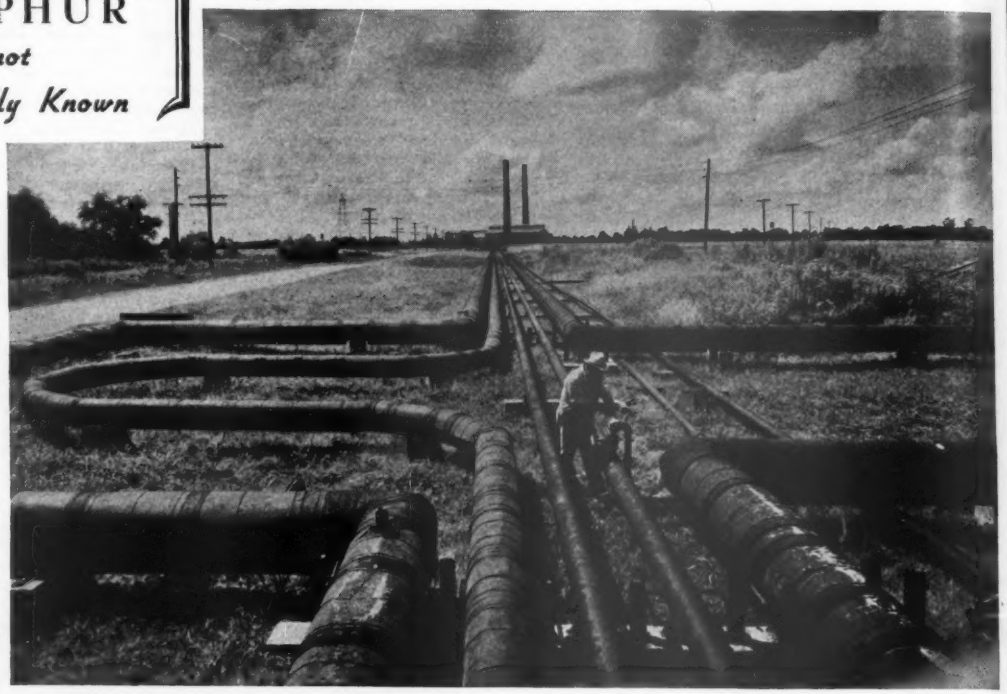
● Commercial shipments of Glauber's salt mark the first quantity production of chemicals at the new plant of Desert Chemical Company, Dale Lake, California. The first year's cycle is expected to produce 50,000 tons of anhydrous sodium sulphate, which analyzes 99.5 per cent purity.

Desert Chemical's operations are significant in that they bring into production an apparently unlimited supply of sodium sulphate, and demonstrate a "natural" process of recovery, not possible with other salt deposits. The limited area already completely proven by test wells shows about 12,000,000 tons of sodium sulphate, while the entire property is estimated to hold between thirty and thirty-five million tons.

A combination of temperature extremes with low relative humidity, a salt deposit containing only two chemical (sodium sulphate and sodium chloride) that separate naturally by fractional crystallization, and an abundance of fresh water, makes possible the process used. Cold precipitates the sodium sulphate as Glauber's salt, which is re-dissolved and dehydrated in hot weather. The residual brine, containing sodium chloride, is evaporated in huge lakes.



Interesting Facts about SULPHUR *not Generally Known*



Pipe Lines

More than seventy miles of pipe constitute the vital circulatory system of the *Newgulf Sulphur* mining plant of the Texas Gulf Sulphur Company. Pipe ranging from 16-inch mains, carrying the supply of hot water to the field, to the small arteries which distribute the steam and air. ☆ Sulphur lines, steam lines, air lines, mud lines, hot and cold water lines, "bleed water" lines, course in smooth symmetrical array from the plant, over the terrain and into the depths of the earth, welded to make them tight, suspended on rollers and provided with expansion loops to allow for changes in temperature, and insulated to prevent heat loss. ☆ Each with a specific function. Each separate line delivering in its turn, under carefully regulated conditions, water, steam, mud, "bleed water" and air—so that Sulphur may flow in an uninterrupted stream to vital American industries.

TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Newgulf and Long Point, Texas

Cargo Space Troubling British Columbia Mills

• Ship shortages are multiplying the export troubles of British Columbia pulp and paper exporters these days.

Cost of doing business in overseas markets is steadily rising, but the major difficulty is in getting shipping space.

Any advantage which British Columbia might enjoy as a result of curtailed exports from northern Europe and resultant reduction in competition has been offset in many territories by the fact that, regardless of demand, the goods can't be shipped owing to lack of tonnage.

Pacific Mills, Ltd., Crown Zellerbach Corporation subsidiary at Ocean Falls, has been shipping an average of 12,000 tons of kraft and other paper to South Africa annually. This trade gave promise of developing into even larger and more prosperous proportions, but the shipping line that handles nearly all the business between the west coast of Canada and South Africa has given notice that it will probably have to cut its service in half, guaranteeing space for 500 tons monthly instead of 1000. Renewal of the Canadian government's subsidy to another freight line operating in that route may partly remedy the situation before long, but the outlook is anything but certain.

Officials of Pacific Mills say that their export policy in the past has been directed towards meeting the requirements of the British Empire countries first. However, if ship shortages result in drastic reduction in orders from Empire lands, then the company will be obliged to look elsewhere for its markets. If South African trade recedes very much, for instance, Pacific Mills will resume negotiations with buyers in South America, where it has done considerable business in the past, especially in kraft.

Newsprint sales to Australia have declined about 20 per cent in the past year, according to executives of Powell River Company and Pacific Mills, British Columbia's two newsprint producers. The Australian publishers are still under contract with Canadian mills for a fixed amount of newsprint, but rationing of paper in the commonwealth to produce much smaller newspapers than in normal times and reduction of inventories have taken a sizeable slice out of the business done.

Exporters state that shipping connections have been fairly well maintained with Australia, except that wartime conditions have imposed considerable uncertainty regarding deliveries. They never know when a ship will start loading until it appears outside the shipping port, and they are similarly in the dark about arrivals at destination. When shipments are made war restrictions make it impossible to send cable advices as this would disclose information of ship movements to the enemy. Communications are usually made by Clipper air mail, and the letters sent that way usually reach their destination before the cargoes.

Small parcel shipments of newsprint are being made to Shanghai, but that is about the only Oriental port now open for pulp or paper cargoes from Canada. Hongkong takes some, but in insignificant volume.

India and the Middle East would like to buy pulp and paper in British Columbia, according to advices from Canadian trade commissioners, but here again the ship situation enters the picture.

Henri Turcot, Canadian trade commissioner at Cairo, advises that newsprint, wrapping paper and similar materials from the Pacific Northwest are required in northern Africa and that British successes over Il Duce's troops should open the way for their shipment, but Mr. Turcot forgets that demand is not the only element in war markets to be considered. There is the all-important factor of delivery, and ships simply are not to be had for that run at present.

Other conditions discouraging trade in that zone are the continued risk of shipping through the Red Sea and the disinclination of buyers in non-sterling areas to pay in dollars because of the exchange differential.

It would seem as though British Columbia pulp and paper must continue to find its chief sales outlet in the domestic market despite the fact that many overseas countries are hungry for it as a result of their isolation from sources of supply they used to depend upon in pre-war days.

J. F. C. Hagens Dies In San Francisco

• J. F. C. Hagens, general manager of the Great Western Division, The Dow Chemical Company, died in San Francisco on February 8th. He had been in poor health for several years.

As president of the Great Western Electro-Chemical Company, first producer of liquid chlorine and caustic soda on the Pacific Coast, Mr. Hagens was well known in the pulp and paper industry.

Born in Bremen, Germany, in 1870, Mr. Hagens went to Honolulu as a youth of 17. He worked on the sugar plantations and for a short time was a newspaperman with the Hawaiian Star before becoming associated with the Pacific Guano Fertilizer Company. He joined the company as bookkeeper and worked up to become general manager. In 1914 he became vice president of Hackfeld and Company which firm later became American Factors. In 1917 he resigned to take a commission as captain in the U. S. Army Quartermaster Corps during the World War.

After the war Mr. Hagens engaged in the chemical brokerage business in San Francisco until elected president of the Great Western Electro-Chemical Company in February, 1920. He served as president until the merger with The Dow Chemical Company on December 31, 1938, at which time he became general manager of the Great Western Division, The Dow Chemical Company.

Mr. Hagens' business ability is clearly shown by the record of Great Western. At the time he became president it was more than a million dollars in debt. In eighteen years he developed it to a position which justified its purchase at a price of nearly twelve million dollars.

He was a man of kindly nature and performed much philanthropic work which was known to only a few of his closest associates. In recent months his health had not permitted him to be very active in business but he maintained an office at the company headquarters until the time of his death.

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EASTWOOD-NEALLEY CORPORATION

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Finishes 1940-1941 Term

• Final class of the 1940-41 Crown Willamette Paper School at Camas, Washington, was held February 27th. George W. Charters, assistant manager, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, at Camas, spoke on "Maintenance." Dean of the Paper School A. G. Natwick, also assistant manager at the Camas plant, presided.

Charles Witt to Greet Visitors to Camas

• Charles Witt, Jr., formerly of the technical department, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington, has been assigned to handle the Camas banquets and supervise the reception of visitors to the plant. He replaces Jack Ziegler, who has been transferred to San Francisco.

Keyes Wins Badminton Trophy

• Another trophy winner was added to the Puget Pulp family of sportsmen when Mr. and Mrs. William Keyes won the Northwest Washington badminton mixed doubles at the tournament held in the Western Washington College gymnasium the evening of March 1st. Mr. Keyes is also holder of the left-handed open golf trophy for Washington.

Quigg Named Fir-Tex Superintendent

• George Quigg became superintendent of Fir-Tex Insulating Board Company at St. Helens, Oregon, on March 1st. He replaced Jack Hubert who was formerly superintendent of the plant.

The new improved

"OPEN BACK" Screen Plate

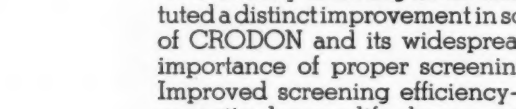
THE conventional design of flat screen plates has remained substantially unchanged for many years. Chromium plating constituted a distinct improvement in screening procedure. With the advent of CRODON and its widespread acceptance by papermakers, the importance of proper screening received increasing recognition. Improved screening efficiency—finer slots, cleaner paper, greater capacity, longer life, lower operating costs—these are the more important benefits to the users of CRODON-plated screen plates.

20,000 SCREEN PLATES have been CRODON-plated

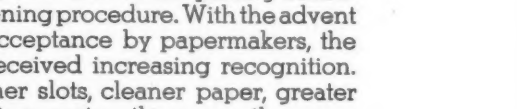
Long-time performance records have conclusively proved their multiple advantages and substantial economies.

The OPEN-BACK feature is of two-fold advantage .....

1. Widening of the back slots permits easier stock release and consequently less possibility of clogging.
2. It allows improved coverage of CRODON plate within the slots, where adequate protection is most essential.



Cross-section of standard screen plate, showing conventional slot construction.



Improved OPEN-BACK design, showing enlarged discharge area and rigidity provided by small alternate bars.

THE OPEN-BACK construction (patent pending) is designed primarily for use only with CRODON-plated screen plates and is not recommended unless in conjunction with chromium plating. It is believed that material benefits will result from the use of the new improved OPEN-BACK screen plates. We shall be pleased to exhibit samples and provide further information upon request.

CRODON
The Chrome Plate

OTHER outstanding successful applications in the paper industry are on press rolls, suction box covers, slice lips, forming boards, drying drums and embossing rolls. These and other applications are fully described in bulletins which will be furnished on request.

Behind every CRODON application are the resources, experience and reputation of America's oldest and largest industrial chromium plating organization. The ability to provide satisfactory performance is the consequence of years of experience, continuous improvement, high technical standards, skilled personnel and modern equipment. The established endurance and recognized utility of CRODON invite comparison with ordinary or less serviceable plating of uncertain merit. CRODON is your dependable guarantee of the most practicable and economical service available.

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Powell River Dam To Be Completed In October

• Powell River Company's $1,000,000 dam project will be completed some time in October, according to present estimates of A. S. McLean, president and general manager, and William Way, chief engineer, of Stuart Cameron Company, Vancouver, contractors.

Already it is possible to gain a fairly accurate conception of what the finished job will look like.

The new dam, requiring the pouring of 200,000 tons of cement, is of the constant arch type 650 feet long with a maximum height of 187 feet. It replaces 2600 feet of temporary wood stave penstock which was installed at the time the company first embarked on its Lois River power expansion program ten years ago.

The dam raises the level of Powell Lake about 50 feet and permits installation of a second 18,000 KVA hydroelectric unit at the company's Stillwater power plant if and when such expansion is found necessary.

Questioned as to the company's policy on completion of the dam towards further increasing mill production, a spokesman for the company remarked that there was nothing definite to announce, but that "Powell River never stands still."

Immediate increase in the company's power output resulting from completion of the new dam will be only about 1500 horsepower. Addition of a new turbine and other adjustments would make it possible for Powell River Company to proceed with installation of another paper machine, but if the directors have any such design they are not saying anything about it yet.

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CELLULOSE
PURIFICATION
EQUIPMENT

McLaren Recovering From Illness

• The many friends of Thomas McLaren, vice-president and treasurer of the Crown Zellerbach Corporation, San Francisco, will be glad to hear that he is convalescing at his home after a severe illness.

Ossie Defieux In Hosiptal

• O. T. Defieux, chief steam engineer, Crown Willamette Paper Company, Division of Crown Zellerbach Corporation, Camas, Washington, was confined to the St. Joseph hospital at Vancouver, February 24th for observation.

Friends Mourn George A. Macklem

• George A. Macklem, a vice president of the Beloit Iron Works, and for over forty years an outstanding figure in the paper and paper machinery industries of the United States, died suddenly on January 9th in his room in a Miami, Florida, hotel where he and Mrs. Macklem had gone before Christmas for the holidays. A heart attack was the cause of death. He was seventy-five years old.

The funeral services were held in Beloit at the First Congregational Church. Interment was at Eastlawn Cemetery.

He is survived by his wife, four daughters and two sons. The daughters are Mrs. Erling Alvung, Miss Elizabeth Macklem, Mrs. Fred Rainey and Mrs. Thomas Airth. The sons are William Macklem and C. E. Macklem. There are several grandchildren.

Mr. Macklem was born in Wilmington, Delaware, and as a young man learned the paper making machinery business with the Pusey & Jones Corporation. He learned his trade in the shops and became an erecting engineer and finally a sales engineer. While with this company he installed paper making machinery in England, Germany, Mexico and other foreign countries as well as the United States.

In 1907 he came to the Beloit Iron Works to serve in the capacity of a sales engineer. It was an association that lasted thirty-four years. In 1927 he became vice president of the company in charge of sales.

His technical qualifications and abilities made him one of the ranking figures of the industry. He was a member of the American Society of Mechanical Engineers, and his counsel and advice were sought after in problems in the field of paper making.

During his residence in Beloit, Mr. Macklem was an active member of the First Congregational Church. He had served the church at various times as a member of the Board of Trustees and a deacon and he was one of the most active members of the Men's Club of the Congregation.

Other organizations in which he took an active interest were the Masonic lodge, and the Beloit Historical Association which he served several years as vice president. He was a very generous supporter and advisor of the Salvation Army and his name was always closely linked with all charitable and civic enterprises in the community.

Mr. Macklem's loss will be felt keenly by his many friends and business associates. His courage, honesty and high ideals will long be remembered.

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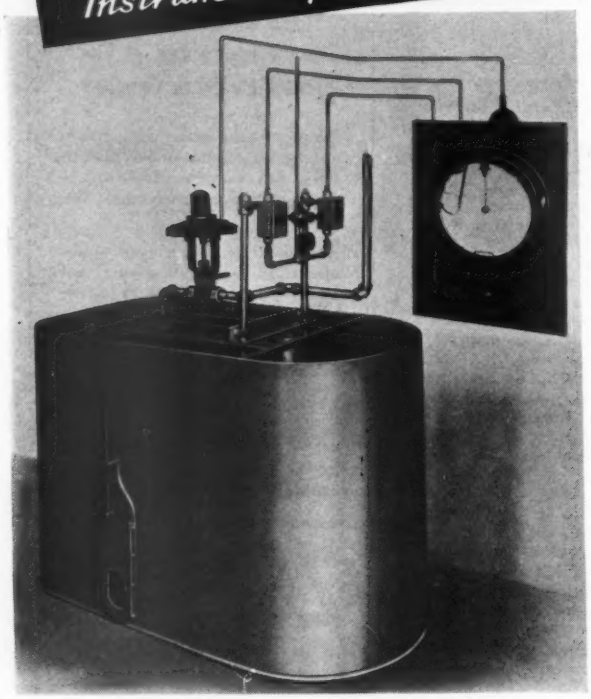
PAID
IN TAXES FOR 1940

Puget Power's taxes for 1940 were $1,840,615 greater than, or more than three times, those of 1930. They were over 50% of the wages earned by its employees. Puget Power's employees and plant facilities worked an average of from Monday to Wednesday noon of each week for the tax collector.

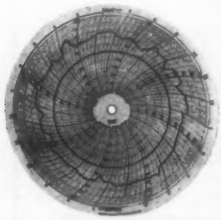
PUGET SOUND POWER & LIGHT COMPANY

BRAMMER
RECORDING CONSISTENCY CONTROL
Instrument by FOXBORO



Licensed under U. S. Patent Nos.: 1,810,111—1,884,075. Others pending.

Affords the most accurate and dependable control and recording of consistency regulation of pulps, paper stocks, and viscous liquids. Successfully handles regulation of difficult stocks such as "lumpy" rag and free sulphite. Design is simple and unique . . . with important operating and economy features. Responds instantly to the slightest change in consistency. No moving parts eliminate need of lubrication (except control valve stem), and maintenance. The BRAMMER CONTROL bulletin gives the facts. Write for copy.



Both graphs are registered on the Brammer Recording Chart. Outer graph represents accurately the consistency of the stock entering head box from the stuff chest before any diluting water has been added. Inner graph represents the consistency of the stock leaving head box after diluting water has been automatically added in proper proportion to secure uniform stock consistency.

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Port Townsend Booklets In Big Demand

● Since the historical booklets presented by the Port Townsend Chamber of Commerce came off the press early in March a big demand has developed with hundreds of people requesting copies.

The booklets, telling the story of Port Townsend in brief but interesting form, are still available from the chamber of commerce as 10,000 were printed. One thousand of the booklets were turned over to Fort Worden for the new men to read and send to their former homes.

The Crown Zellerbach Corporation cooperated in publishing the brief history and the booklet is printed on kraft paper made by the Port Townsend Division.

Scott Paper Lowers Prices

● Scott Paper Company of Chester, Pennsylvania, has announced new lower prices on ScotTissue, Waldorf and Scot-Towels for Kitchen Use.

At the same time, the company also announced that the quality of ScotTissue had been further refined as a result of exhaustive consumer research. The company asserts that the softness of the tissue has been "remarkably improved while at the same time the important balance of other qualities which have made this brand so famous has been preserved."

The improved product and lower prices under the unusual market conditions of today is commented upon by William F. Mohan, First Vice President, Scott Paper Company, who in a notice to the trade states there are three principal reasons why such steps are possible for his company.

He gives these reasons as follows: 1. "Steadily increasing volume of sales, reaching a new record in 1940. 2. "Efficiencies secured in manufacture. 3. "New sources of raw materials."

Mr. Mohan traces the current price reduction and quality improvement to a carefully planned program inaugurated four years ago by Scott Paper Company. During this period Scott Paper Company installed three new modern, high speed paper machines of special design to handle the increased sales volume; six other large machines were rebuilt and the same program of modernization was applied to other phases of the manufacturing process and auxiliary services.

While the execution of the manufacturing improvement program was progressing the company also intensively developed its raw material sources. Mr. Mohan said that in 1937 a pulp plant at Brunswick, Georgia, was built in conjunction with another concern and this year was enlarged. He pointed out that other purchases by Scott include the Coos Bay Pulp Company, at Empire, Oregon, and the Anacortes Pulp Company at Anacortes, Washington.

"These pulp sources, in addition to our mill in Nova Scotia, now give us greater control over our supply and quality of raw materials," Mr. Mohan pointed out.

Properties of Concrete Curing Paper

● To assist in the development of a Federal specification the National Bureau of Standards has made tests of the asphalted kraft paper used to cover newly-laid concrete for prevention of too-rapid drying, which would cause cracking, and for protection during drying. It appears that the type of paper most suitable for the purpose is that consisting of two sheets of kraft paper cemented together with asphalt in which are embedded cords or strands of fiber running in both directions of the paper, and spaced not more than 1¼ inches apart. Such paper is very resistant to breakage and to permeation by water.

Tests of papers which had given good service under actual conditions of use indicated that satisfactory paper should have a dry tensile breaking strength, per inch width, of not less than 50 pounds in the machine direction and 30 pounds in the cross direction; a wet tensile strength, per inch width, of not less than 20 pounds in the machine direction and 10 pounds in the cross direction; and a water resistance of not less than 20 hours when tested by the dry indicator method.

It was found desirable to use a strip 2 inches wide in making the tensile test because of the influence of the cords or strands of fiber on the test values. The test for wet tensile strength was made on strips that had been immersed in water for one hour. The dry-indicator test is that developed by Carson at the Bureau. It consists of sprinkling on the test specimen a dye indicator which changes color when it becomes moistened with water that permeates through the paper when it is floated on water.

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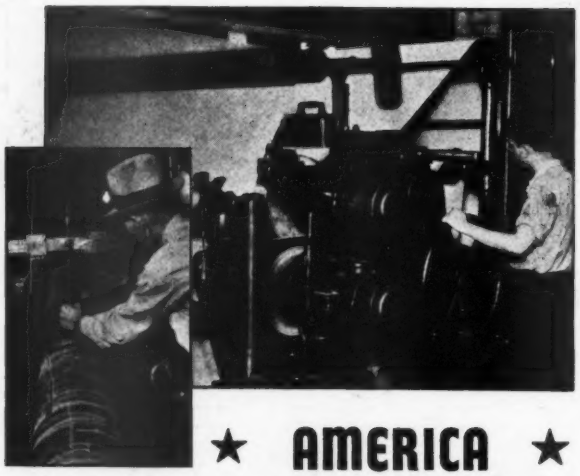

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A National Emergency has small patience with sit-down strikes, whether of men or of machines. Down time for adjustments, slow speeds for slow drying, excessive breakage due to poor formation of sheet, needless waste of fuel resulting from inefficient performance at the wet end — all these sabotage the National Defense Program. • Put your paper machines into top efficiency. Regrind rolls and bearings to correct uneven wear and faulty alignment. Install Hamilton Felts and run full speed. • You will find Hamilton Felts remove more water, faster. They deliver dryer sheets of better formation to the driers. They reduce broke and prevent costly shut-downs for adjustment. They cut fuel bills. They are as tough as Australian soldiers. They do their duty — and then some.

From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

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